DELTA DESIGN
INC.

3900

INSTRUCTION MANUAL

DELTA DESIGN, INC.
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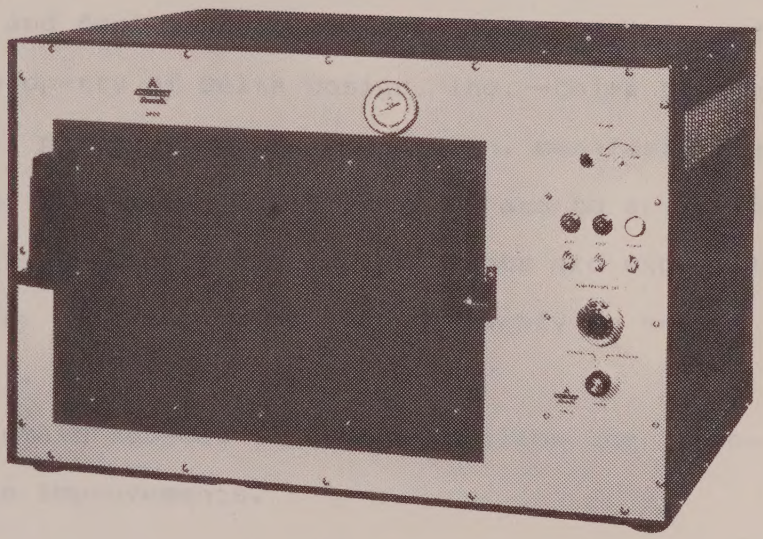
INSTRUCTION MANUAL
Model 3900



DELTA DESIGN
INC.

ENVIRONMENTAL TEST CHAMBER

ENVIRONMENTAL CONTROL EQUIPMENT FOR RESEARCH AND INDUSTRY
5725 KEARNY VILLA ROAD • SAN DIEGO, CALIFORNIA 92123

3900-0980

Printed in U.S.A.

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San Diego, CA 92123

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SPECIFICATIONS

TEST VOLUME (H x W x D)	10" x 16" x 10" (25.40_3 x 40.64_3 x 25.40 Cm) .92 FT^3 ($.026M^3$)
AIR CIRCULATION	Two 140 CFM Centrifugal Blowers With Baffling To Provide Equal Distribution Throughout The Chamber. The Air Flow Is In A Vertical Pattern.
OUTSIDE CASE DIMENSIONS (H x W x D)	17-7/8" x 27-1/2" x 24" (46.40 x 69.85 x 60.96 Cm)
INNER LINER	Type 302 Stainless Steel
OUTER CASE	Aluminum
INSULATION	Fiberglas
WEIGHT	90 Lbs (40.82 Kg)
POWER REQUIREMENTS	120 VAC, 50/60 Hz, Single Phase, 1875 Watts or 240 Vac, 50/60 Hz, Single Phase, 1875 Watts
CONTROLS	POWER On-Off Switch and Light COOL On-Off Switch and Light HEAT On-Off Switch and Light TEMPERATURE SET Control MANUAL/PROGRAM Control Switch (MODE)
HEATING ELEMENTS	Four 8.75 Ohm Elements, Total Of 1,775 Watts, Nichrome Wire
COOLING	Liquid Carbon Dioxide (LCO_2) or Liquid Nitrogen (LN_2)
PROGRAMMING	Programmable
COOL DOWN TIME	Ambient to $-54^{\circ}C$ in 2-3/4 minutes
HEAT UP TIME	Ambient to $+217^{\circ}C$ in 15 minutes
TEMPERATURE RANGE	$-73^{\circ}C$ to $+315^{\circ}C$
RESETTABILITY	$\pm 0.25^{\circ}C$
TEMPERATURE DEVIATION	$\pm 0.1^{\circ}C$

LINE VOLTAGE STABILIZATION	±0.25°C For 105 to 125 VAC Line Voltage Change ±0.25°C For 220 to 240 VAC Line Voltage Change
AMBIENT TEMPERATURE COMPENSATION	±0.010°C/°C
HEAT LOAD COMPENSATION	±0.040°C/Watt
GRADIENT IN TEST AREA (1-1/2" from walls in corners and in the center of the test area)	±0.75°C/100°C Difference Measured From Ambient
THERMAL IMPEDANCE OF CHAMBER	Approximately 0.75°C/Watt
NULL DETECTOR CONTACT CLOSURE	Temperature Will Be Within 2°C Of Final Temperature At 3 Minutes After Closure Occurs
NULL DETECTOR CONTACT RATING	1 Amp, 240 VAC, With Contact Protection Provided By User To Protect Against Inductive Loads

NOTE: IT IS RECOMMENDED THAT THIS MANUAL BE READ THOROUGHLY BEFORE CONNECTING EQUIPMENT TO ELECTRICAL POWER SOURCE.

INTRODUCTION

This Delta Design, Inc. Chamber is a precision environmental test chamber capable of attaining temperatures from -73°C to +315°C with a minimal temperature deviation of ±0.1°C.

Temperature control in this chamber is by means of Delta's Solid State Controller, which can be operated manually or thru an external programmer.

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SCHEMATIC DIAGRAM 120V CO_2 W/LN_2 & DUAL OPTIONS	
SCHEMATIC DAIGRAM 240V W/LN_2 & DUAL OPTIONS	
CHAMBER, TYPE V CONTROLLER RETROFIT - 3900	

1 PRECAUTIONS

1.1 Connect SAFETY PLUG (rear of chamber) when external programmer is not being used. This will preclude any accidental high temperature being obtained if the MODE switch is placed in the PROGRAM position with no programmer connected.

1.2 Ground the case of the chamber to earth ground. When a grounded outlet is not available, use the three-to-two adaptor and connect the green colored "pigtail" to earth ground. The chamber must not be operated without the case grounded.

1.3 Unplug the chamber from all sources of power before attempting any type of servicing or removal of the controller chassis. The case of the triac switch assembly, located on the controller subassembly, is at power line potential and extreme care in servicing or calibration must be exercised.

1.4 Do not block the sides of chamber or outlet of controller area on bottom of the chamber for cooling purposes.

1.5 Ensure that the correct type of LCO_2 (liquid carbon dioxide) source is connected to the chamber before operating at low temperature. Recommend standard 50 pound capacity high dry siphon LCO_2 supply. Test the LCO_2 for cleanliness by discharging a quantity of it through a clean white handkerchief. Bits of rust and traces of oil, ice or water indicate contaminated LCO_2 which should not be used.

1.6 Operate the chamber at a temperature of 200°C for an hour after prolonged operation at low temperatures. This restores the efficiency of the insulating material by driving out the moisture which has been condensed out of the air.

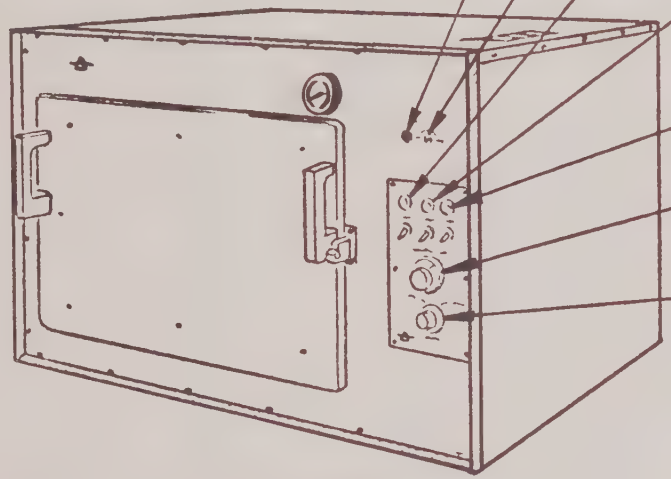
CAUTION

Liquid oxygen may be formed in the insulation when the chamber is operated at low temperatures. Any mixture of oil and liquid oxygen can be explosive. If oil contamination is suspected, bake the chamber out by operating it at a temperature of 200°C for a period of three hours before taking it to extremely low temperatures.

1.7 Do not leave liquid nitrogen trapped in a line (valves closed at both ends) as high pressures will be developed as the liquid absorbs heat and becomes gas.

FAILSAFE ADJUST- LOCATED ON FRONT OF CHAMBER
TURN TO CHANGE TEMPERATURE AT WHICH FAILSAFE WILL TRIP
CAUTION: DO NOT LOWER FAILSAFE TEMP. SETTING UNLESS HEAT SW. IS ON & FAILSAFE IS OFF.

FAILSAFE LAMP- GLOWS RED WHEN FAILSAFE IS TRIPPED



THERMOMETER- INDICATES CHAMBER TEMP. IN TEST VOLUME.

(5) HEAT SWITCH & LIGHT-- SWITCH ON--ON POSITION ALLOWS CONTROLLER TO APPLY HEAT AUTOMATICALLY TO MAINTAIN SELECTED TEMPERATURE IN CHAMBER RED LIGHT IS ON STEADY WHEN CHAMBER IS HEATING, BLINKS WHEN CHAMBER REACHES SELECTED TEMPERATURE ABOVE AMBIENT

(4) COOL SWITCH & LIGHT--SWITCH ON--ON POSITION ALLOWS CONTROLLER TO APPLY COOLANT AUTOMATICALLY TO MAINTAIN SELECTED TEMPERATURE IN CHAMBER GREEN LIGHT IS ON STEADY WHEN CHAMBER IS COOLING.

(3) POWER SWITCH & LIGHT--SWITCH ON MAIN POWER ON WHITE LIGHT GLOWS WHEN POWER IS ON.

(2) TEMPERATURE SET DIAL--SET TO DESIRED TEMPERATURE. SELECTS CHAMBER TEMPERATURE IF MODE SWITCH IS IN MANUAL POSITION.

(1) MODE SWITCH--SET TO MANUAL POSITION. ASSIGNS THE SELECTION OF CHAMBER TEMPERATURE TO TEMPERATURE SET DIAL OR EXTERNAL PROGRAMMER.

MANUAL POSITION: TEMPERATURE SET DIAL DETERMINES CHAMBER TEMPERATURE.

PROGRAM POSITION: PROGRAMMING RESISTANCE CONNECTED TO PROGRAM JACK AT REAR OF UNIT SELECTS CHAMBER TEMPERATURE.

CAUTION: ALWAYS CONNECT SAFETY PLUG (AT REAR OF CHAMBER) WHEN AN EXTERNAL PROGRAMMER IS NOT BEING USED

OPERATING INSTRUCTIONS:

A. INSTALL THE CHAMBER, CONNECT POWER CORD TO SUITABLE OUTLET & COOLANT SUPPLY TO VALVE INLET.

B. FOLLOW STEPS 1 THRU 5.

Fig. 1

OPERATING INSTRUCTIONS
FIGURE 1

2 OPERATING INSTRUCTIONS

2.1 Uncrating - Remove all shipping tie downs and protective packaging.

2.2 Power Connection - Power connection should be an AC power source rated at 120V, 50/60 Hz single phase, 1875 Watts or 240V, 50/60 Hz single phase, 1875 Watts (240V option). The chamber must be connected to earth ground (green wire).

2.2.1 Delta chambers that operate on 240 VAC split the incoming phases for the coolant valve solenoid, failsafe relays, blowers and for the controller. The heater circuit operates on 240 VAC.

2.3 Liquid Coolant - Liquid Carbon Dioxide (LCO_2) - 1050 psi system (standard). Optional systems are LCO_2 - 300 psi, and Liquid Nitrogen (LN_2) - 100 psi.

2.3.1 Liquid Carbon Dioxide - 1050 psi system. A siphon type liquid CO_2 bottle is recommended.

2.3.1.1 Test the bottle by releasing a small amount of LCO_2 into a white handkerchief. Any brown stain indicates rust which would clog the filter and valve in the chamber. A wet handkerchief indicates water which would either freeze in the valve or clog the injector nozzle. Crack the LCO_2 valve open on the cylinder and notice the spray. It should be a dense, white cloud. It looks thin and gray when the tank is almost empty. An almost empty tank will not give proper cooling and should not be used. Connect the tank of LCO_2 to the rear of the chamber with the supplied high-pressure hose and fittings. Place a small amount of sealing compound on the threads of the male fitting to prevent leakage. DO NOT LET ANY SEALING COMPOUND GET INTO THE VALVE INLET ON THE REAR OF THE CHAMBER. Open the bottle and check for leaks which show as frosty spots on the hose or fittings.

2.3.2 Liquid Carbon Dioxide - 300 psi Low Pressure system.

2.3.2.1 When the in-plant use of liquid CO_2 exceeds approximately 1000 to 2000 pounds per month, a bulk liquid storage system can be

installed to reduce the cost of coolant. Chambers being operated with this type of system have to be fitted with a different CO_2 valve and injector than used on a 1050 psi system. Contact Delta for information concerning valve replacement. If new chambers are ordered for use with a bulk storage 300 psi system, the fact should be stated on the order.

> NOTE: The bulk storage system should be of the recirculating type if possible. If not, the supply should be located as close as possible to the chamber to minimize gas formation in the supply line. This is particularly important in low volume usage systems as the insulation and fluid flow are the factors that prevent boiling of CO_2 in the supply line. Gaseous CO_2 is not an effective coolant.

2.3.2.2 All lines, valves and connecting hoses should be blown out before the chamber is connected. Water is very troublesome and is apparently inherent in some low-pressure refrigerated supplies. If lines are opened to bleed off excessive pressure at shutdown, close them to prevent contamination by condensed moisture. This will help to keep ice from forming in the control valve.

2.4 Liquid Nitrogen

CAUTION

Oxygen in the air surrounding the chamber inner liner and in the insulation can be liquified at low temperatures. This creates an oxygen rich atmosphere surrounding the heater area. The chamber tends to be self purging as the nitrogen replaces the usual atmosphere near the heaters. Any mixture of oil and liquid oxygen can be explosive so extreme care must be used during operation at very low temperatures.

2.4.1 A 100 psi valve and stainless steel, polyurethane foam insulated, injector assembly is used for the liquid nitrogen applications. LCO_2 from a tank will not operate properly in a chamber equipped for LN_2.

2.4.2 Connect a liquid nitrogen liquid withdrawal container to the LN_2 input of the chamber with an insulated transfer line. A relief valve should be installed in the line with a relief pressure between 60 and 100 psi for a 2700 cubic foot 50 psi liquid withdrawal container.

2.5 Adjusting the Failsafe

2.5.1 To adjust the FAILSAFE high temperature protection unit, rotate the slotted FAILSAFE control. The trip temperature is increased by rotating the control counterclockwise and is lowered by turning the control clockwise. The FAILSAFE setting is preset at the factory at +315°C (maximum rating of standard chamber). If it is desirable to change the setting to a lower temperature setting, operate the chamber at the maximum temperature desired. Adjust the FAILSAFE until it is on the verge of tripping.

CAUTION

Do not rotate the FAILSAFE setting more than one full turn lower than the trip point, as this can damage the unit.

2.6 Reading the Temperature Setting of the Dial Indicator - See Figure 2.

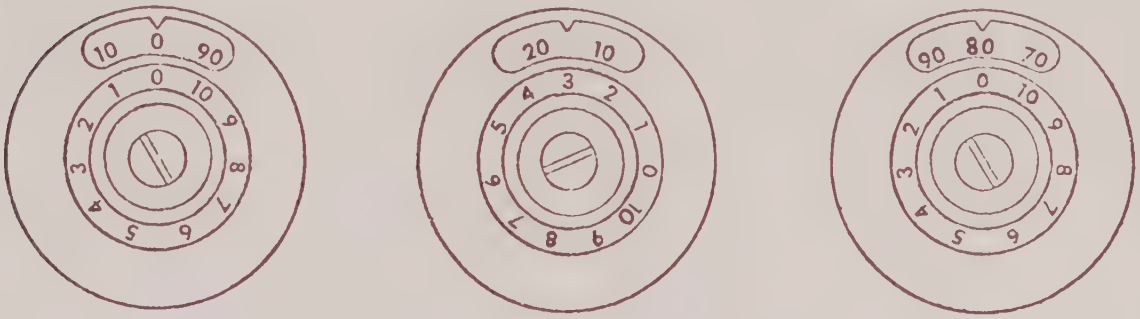
2.6.1 Refer to example A - Set both dials at zero.

2.6.2 One complete rotation of the knob equals 100. Clockwise is plus (+) degrees(F or C) and counter-clockwise is minus (-) degrees. Each rotation of the knob is indicated by the small dial nearest the knob.

2.6.3 The large dial indicates each degree, every tenth numbered. Thus, as in example B, the large dial is set at 15, the small dial is beyond 3, therefore the setting is +315.

2.6.4 When setting to a minus (-) temperature it is necessary to subtract the degrees from 100, i.e., 20 from 100 equals "80" reading on the large dial to have a setting of -20. This is shown in example C.

It will be noted that the zero on the small dial is just to the left of the marker. Also, on the models having a range greater than -100, it is necessary to keep track of the counterclockwise rotation of the knob.



A
(0°)

B
(+315°)

C
(-20°)

FIGURE 2
TEMPERATURE SET DIAL

2.7 Programming

2.7.1 Connect the correct resistances between pins 1 and 3 of the PROGRAM Jack. Set the MODE Switch to PROGRAM and the HEAT and COOL switches to their ON positions. The controller will apply heat or coolant as needed to obtain the programmed temperature.

2.7.2 A Safety plug is provided with the chamber and should be kept connected to the PROGRAM input whenever an actual programmer or actual resistance is not connected. The safety plug will prevent the chamber from accidently being programmed to a very high temperature if the MODE Switch is placed in the PROGRAM position with an open PROGRAM input.

2.7.3 The safety plug disables the heat and cool circuits of the controller when the MODE Switch is placed in the PROGRAM position.

3 CHAMBER & CONTROLLER DESCRIPTION

3.1 Chamber

3.1.1 The chamber is a precision environmental test unit having a stainless steel interior, aluminum outer case and fiberglas insulation. The air circulation is closed and provided by 140 CFM blowers (see Figure 3).

3.1.2 The chamber is heated by applying full wave power to bobbin wound nichrome heating elements via the heat switch.

3.1.3 The chamber is cooled by injecting liquid CO_2 (liquid nitrogen in the LN_2 models) into the air stream through an expansion nozzle. The coolant flow is metered by a solenoid valve, controlled by the COOL solid state switch.

3.1.4 The temperature control system is shown in block diagram form as Figure 8 .

3.2 Solid State Controller

3.2.1 The controller compares the resistance of the temperature probe to the resistance of the indicated set point on the TEMPERATURE SET dial potentiometer or the digital resistance selection of the optional Digitemp controller. The resistance of a remote programming resistor is compared to the probe resistance of the MODE switch in the PROGRAM position.

3.2.2 The resistance of the probe will be either less than, equal to, or greater than the resistance of the TEMPERATURE SET potentiometer (or the DIGITEMP) , i.e., program resistance. These three situations directly correspond to the chamber temperature being lower than, equal to, or higher than desired. The controller applies heat, coolant, or withholds both to obtain and maintain the selected temperature in the chamber.

3.2.3 Mode - The controller is a three mode unit, i.e.:

(a) Heat only
(b) No heat or coolant
(c) Coolant only

This mode of control ensures that LCO_2 or LN_2 is not wasted in a continuous cycling of the heaters and coolant valve such as would be the case for a simple two mode output controller.

3.2.4 Further information on the controller may be found in the complete Type III Controller Manual included as part of this information package.

3.3 Null Detector Circuit

3.3.1 A contact closure is provided at the rear which functions when the chamber reaches the indicated set point of the controller. This contact closure may be used to signal external equipment that the chamber has reached selected temperature.

3.3.2 The Delta Design Model 9308 HI-LO Step Programmer, Model 9311 TEN STEP Programmer, and the Model 9313 HI-LO AMBIENT Programmer utilize the null contacts to start their timers when they are used with the chamber. This contact closure feature is most useful in automatic test programming applications.

4 WARRANTY

Delta Design, Inc. guarantees all products manufactured and sold by it to conform to published specifications and against defective material and workmanship for a period of 90 days from the date of our shipment. Temperature chambers and electronics are warranted for one year from date of shipment. All contactor assemblies are warranted for a period of 90 days or 1/2 million cycles. Obligation under these warranties is limited to repair or replacement by Delta at its plant or one of its authorized service stations, on any of our products which Delta determines to be defective or not in accord with stated specifications. Delta will not accept responsibility for any defect caused by improper use, nor will Delta assume liability for any unauthorized repairs or modifications to its products or materials, even though defective or not in accord with the specifications. In no case will responsibility extend to products, materials, or equipment not manufactured by Delta. All products to be returned to Delta's plant for warranty repair must have prior written approval from Delta Design, Inc., and all return transportation charges will be at the buyer's expense. Delta will not accept liability for any unauthorized returns. No liability will be accepted for any damages to customer's materials, and equipment due to the use or misuse of Delta's products, nor for any loss of profits or other special damages. Delat Design, Inc., reserves the right to change price, design features and/or specifications without notice.

TROUBLE SHOOTING: ELECTRICAL

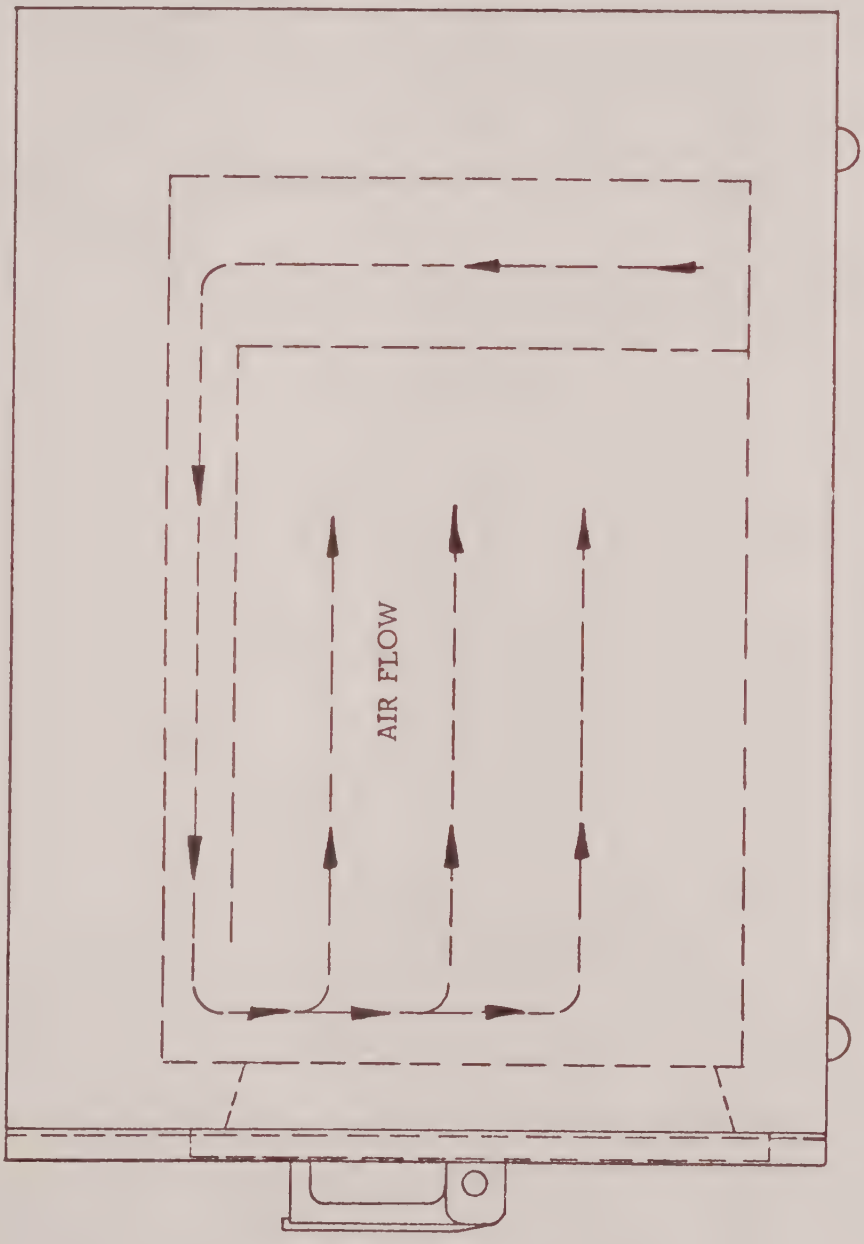
HOW TO USE THIS CHART

1. Turn Mode Switch to Manual.
2. Note Thermometer Reading (Chamber Temperature)
3. Turn Heat and Cool Switches On.
4. Turn Temperature Set Control 50° Higher than Chamber Temperature and note the conditions of the Heat and Cool Lamps.
5. Turn Temperature Set Control 50° Lower than Chamber Temperature and note the conditions of the Heat and Cool Lamps.

These two situations determine the correct block to read in the chart:

6. Enter the Chart at the Top for the conditions observed in step 4. (50° Higher than Chamber Temperature.)
7. Enter the Chart at the Left Side for the conditions observed in step 5. (50° Lower than Chamber Temperature.)

		LIGHT STATE WITH TEMPERATURE SET DIAL 50° HIGHER THAN CHAMBER TEMP.			
		RED - OFF GREEN - OFF	RED - ON GREEN - OFF	RED - OFF GREEN - ON	RED - ON GREEN - ON
LIGHT STATE WITH TEMPERATURE SET DIAL 50° LOWER THAN CHAMBER TEMP.	RED - OFF GREEN - OFF	Probe Element shorted to case. (Replace) Failure on Amplifier P.C. Board. (Trace signal with scope) Transformer Winding open.	Cool Circuit has failed. Trace signals with scope.		
	RED - ON GREEN - OFF		Probe shorted out. Temp. set Pot. — open. Cool Anticipator winding open. Check between Terminal A and Case of Q8 for 10Ω.		
	RED - OFF GREEN - ON	Failsafe Relay K1 not energizing. Coil resistance will be Approx. 10K. Failsafe open. Heat Triac failed.	NORMAL	Probe Open. Temp. Set. Pot. shorted. Heat Anticipator Winding open: Check between B and Case of Q9 for 10Ω.	Cool Circuit has failed — Trace signal with scope.
	RED - ON GREEN - ON		Heat circuit has failed — Trace signal with scope. Triac failed.		



SIDE VIEW

FIGURE 3

CHAMBER AIR FLOW PATTERN

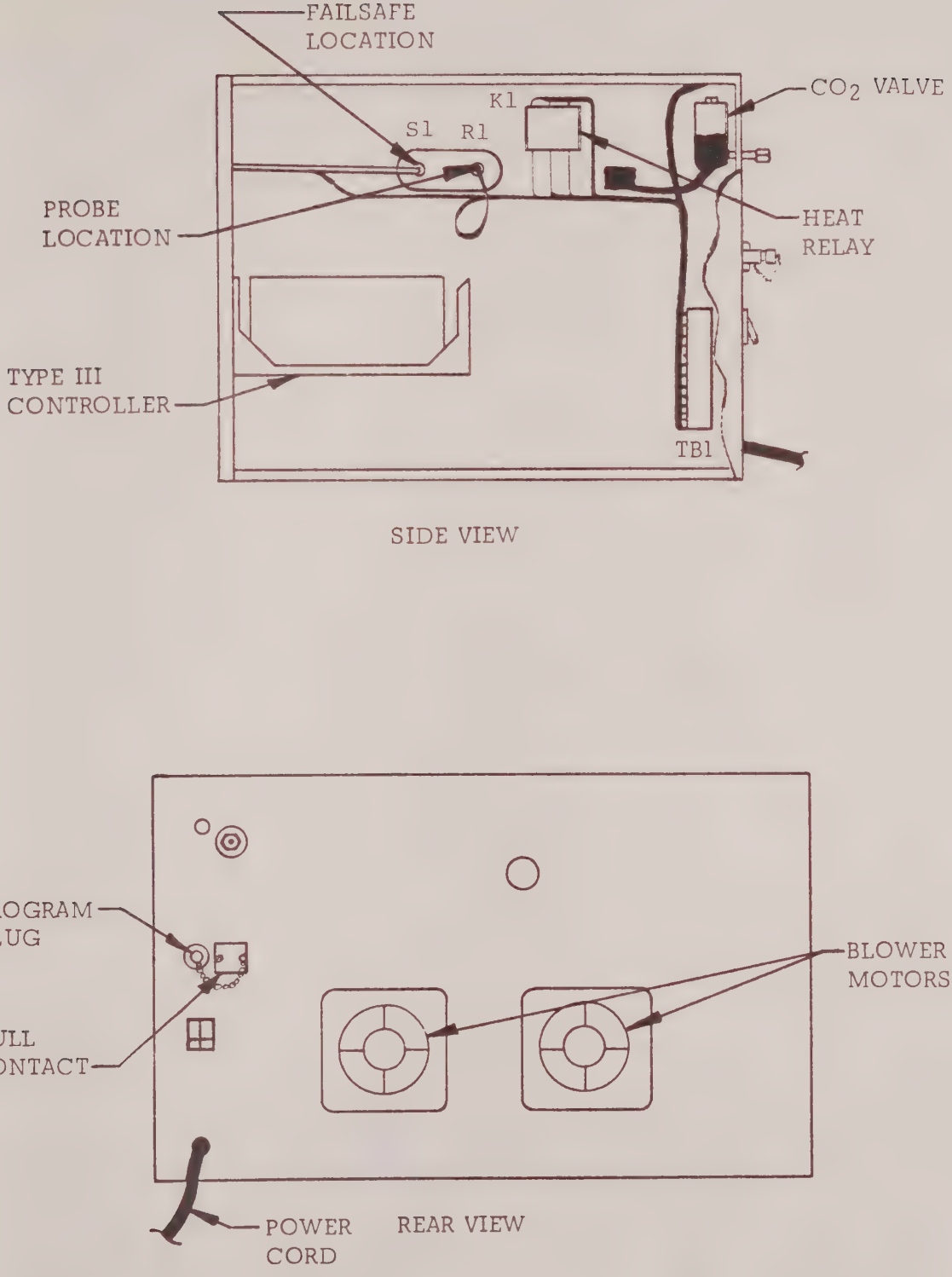


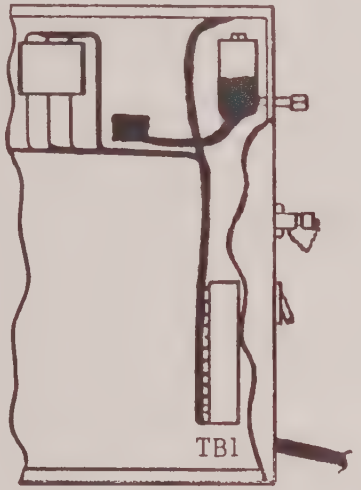
FIGURE 4
COMPONENT IDENTIFICATION

TO REMOVE BLOWER MOTORS

1. Unplug chamber power cord.
2. Do not remove rear panel.
3. Remove 4 screws and lay grill aside.
4. Remove wire nuts connecting motor to chamber power.
5. Remove two screws that mount motor to chamber.
6. Pull motor straight back to remove.

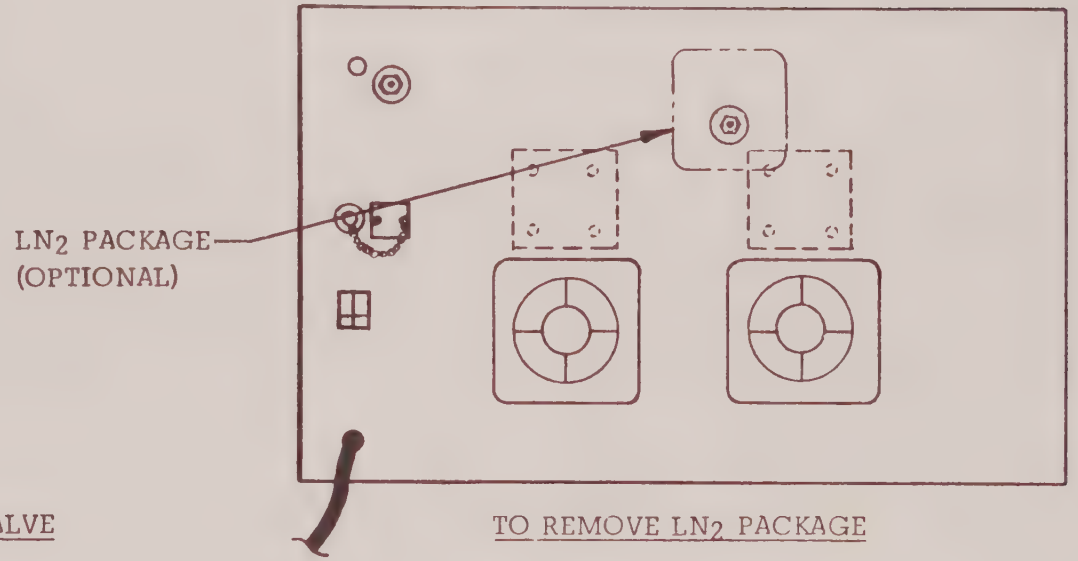
TO REMOVE HEATER

1. Unplug chamber power cord.
2. Remove and lay rear panel horizontally behind chamber.
3. Unpack fiberglas to expose heaters.
4. Remove wires from each heater unit.
5. Remove mounting screws.
6. Pull out heater assembly.



TO REMOVE CO_2 VALVE

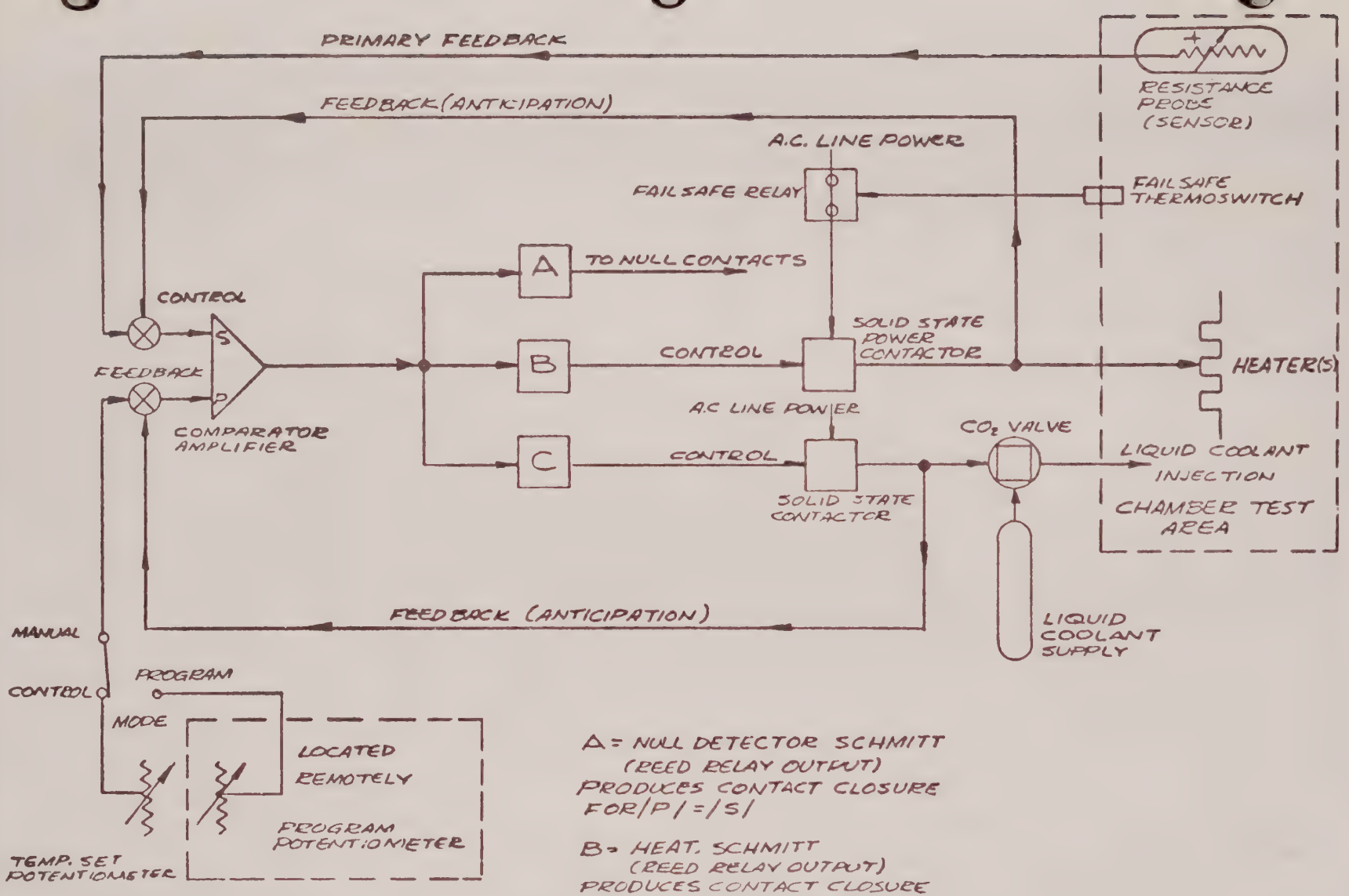
1. Unplug chamber power cord.
2. Remove screws from right side cover.
3. Place right side cover on top of chamber.
4. Unscrew wire nuts.
5. Remove screws and take out CO_2 valve.



TO REMOVE LN_2 PACKAGE

1. Unplug chamber power cord.
2. Remove screws holding cover on valve assembly.
3. Remove screws holding valve to standoffs.
4. Remove nut joining inlet tubing to valve.
5. Pull valve away from chamber rear panel and remove wire nuts.

FIGURE 5
COMPONENT REMOVAL



A = NULL DETECTOR SCHMITT
(REED RELAY OUTPUT)
PRODUCES CONTACT CLOSURE
FOR /P/ = /S/

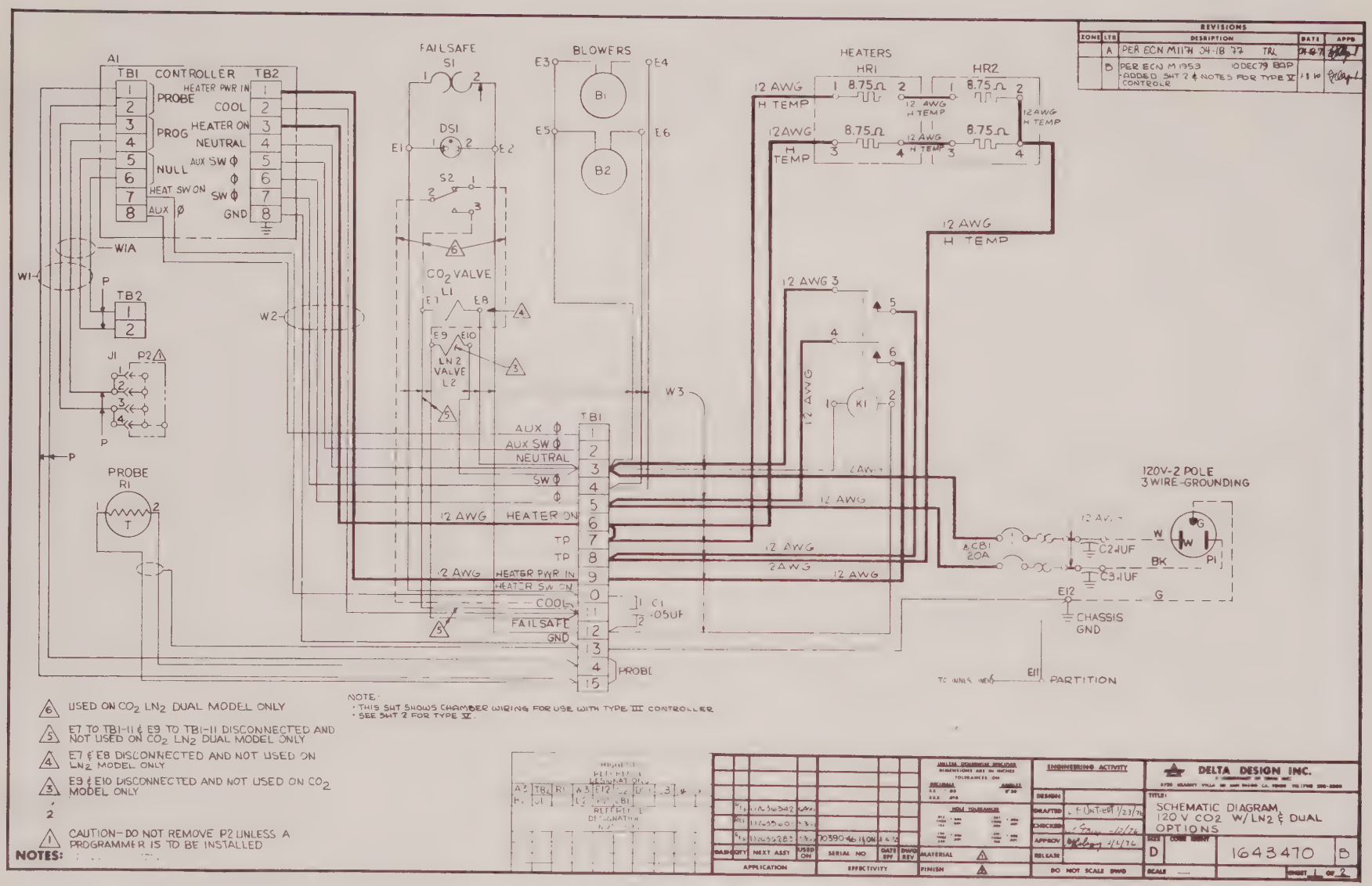
B = HEAT. SCHMITT
(REED RELAY OUTPUT)
PRODUCES CONTACT CLOSURE
FOR /P/ INPUT AT AMPLIFIER
GREATER THAN /S/

C = COOL. SCHMITT
(REED RELAY OUTPUT)
PRODUCES CONTACT CLOSURE
FOR /S/ GREATER THAN /P/

TEMPERATURE CONTROL SYSTEM

SOLID STATE, TYPE III
DELTA DESIGN INC.

FIGURE 6



ZONE	LTR	DESCRIPTION	DATE	APPD
	A	PER ECN M1174 04-18-77 TRL	4-27-77	
	B	PER ECN M1953 10DEC79 BDP *ADDED SHT 2 & NOTES FOR TYPE V CONTROLS	1-8-80	

REVISIONS

NOTE:
* THIS SHT SHOWS CHAMBER WIRING FOR USE WITH TYPE III CONTROLLER
* SEE SHT 2 FOR TYPE V.

6 USED ON CO_2 LN_2 DUAL MODEL ONLY

5 E7 TO TBI-11 & E9 TO TBI-11 DISCONNECTED AND NOT USED ON CO_2 LN_2 DUAL MODEL ONLY

4 E7 & E8 DISCONNECTED AND NOT USED ON LN_2 MODEL ONLY

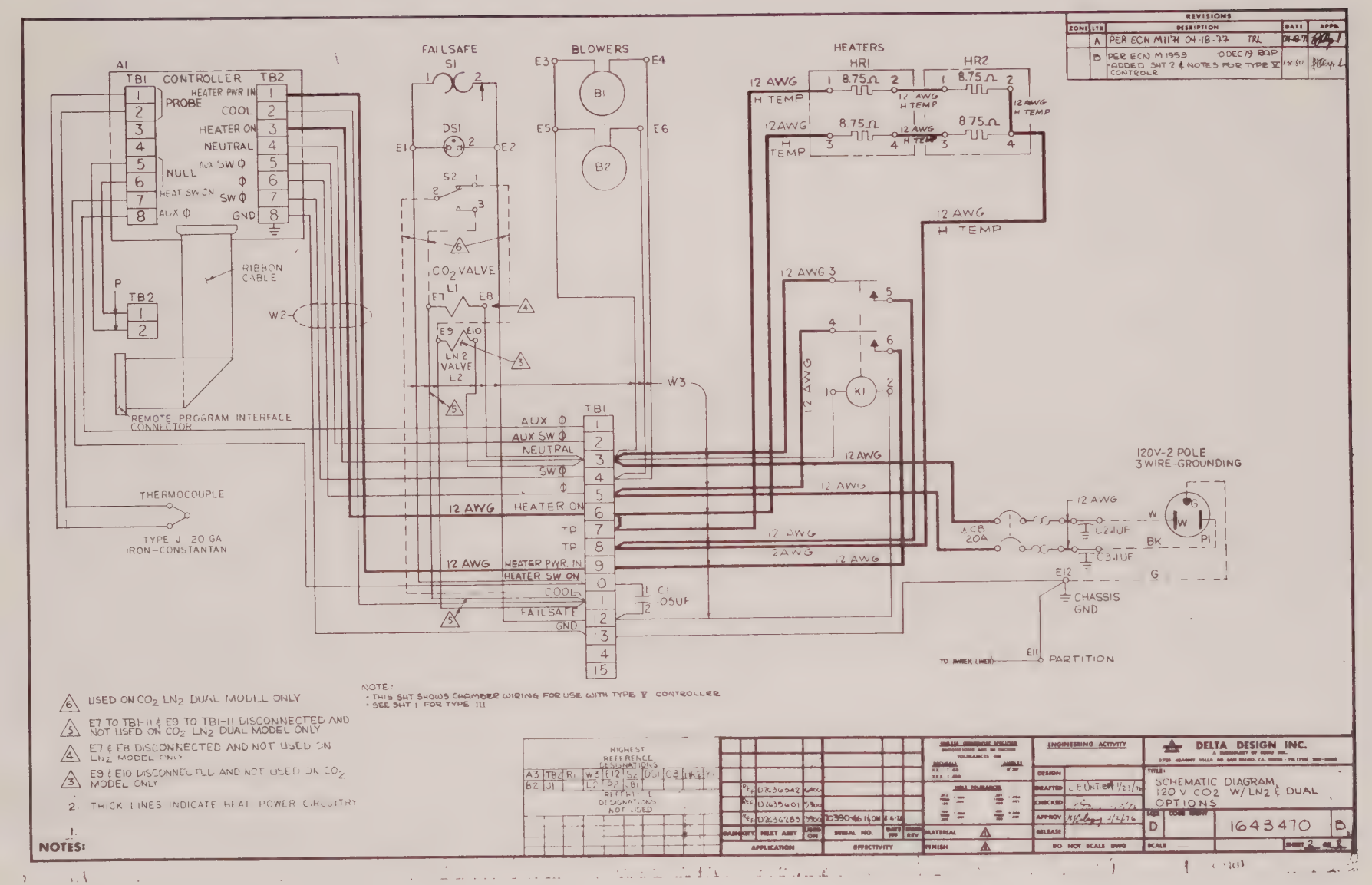
3 E9 & E10 DISCONNECTED AND NOT USED ON CO_2 MODEL ONLY

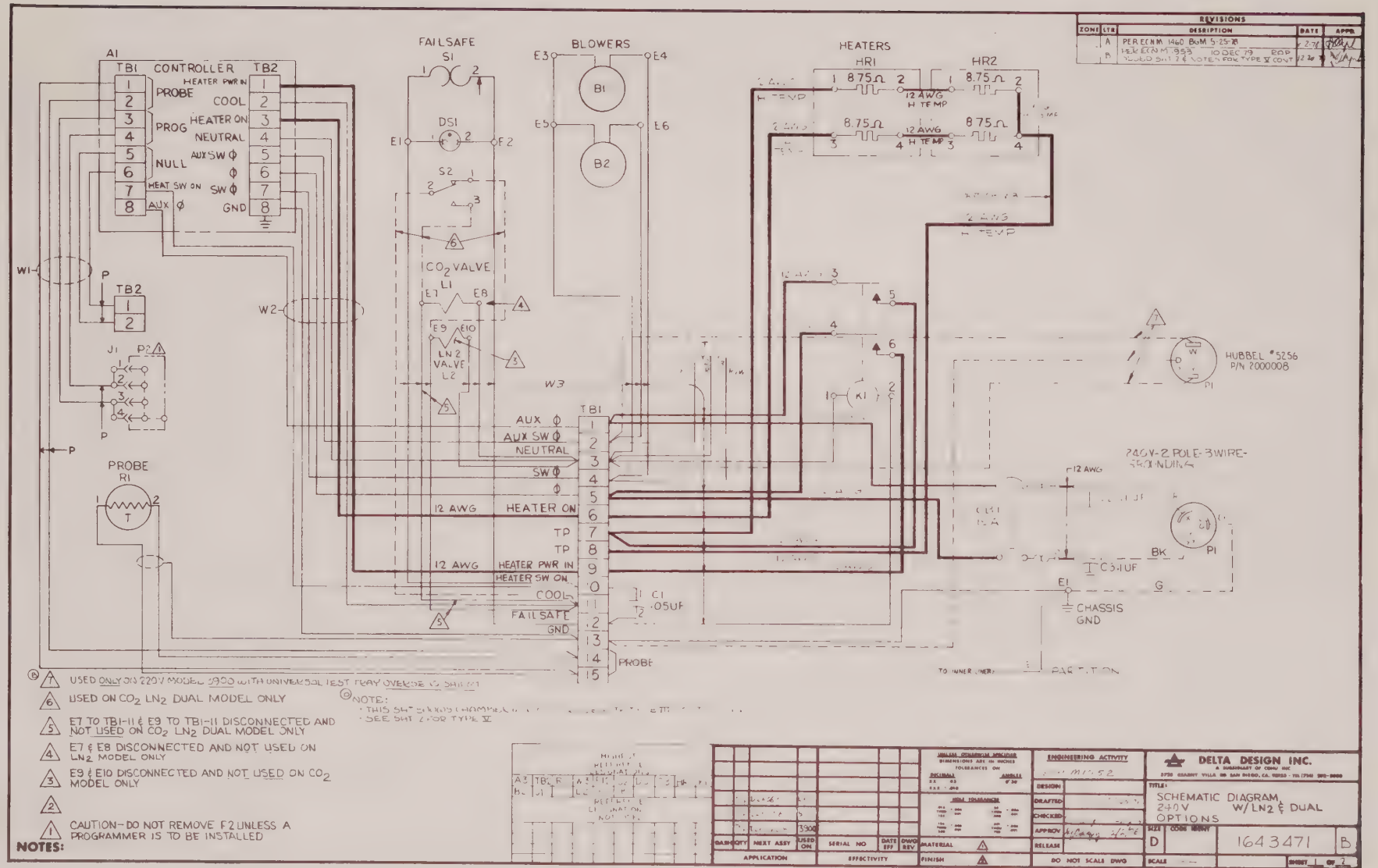
2

1 CAUTION-DO NOT REMOVE P2 UNLESS A PROGRAMMER IS TO BE INSTALLED

NOTES:

BASE QTY	NEXT ASSY	USED ON	SERIAL NO	DATE EFF	DWG REV	MATERIAL	ENGINEERING ACTIVITY	DELTA DESIGN INC.	
APPLICATION			EFFECTIVITY			FINISH	DESIGN	TITLE: SCHEMATIC DIAGRAM 120 V CO_2 W/LN_2 & DUAL OPTIONS	
							DRAFTED	L. F. UNTERBERG 1/23/76	
							CHECKED		
							APPROV		
							RELEASE		
							DO NOT SCALE DWG	SIZE D	CODE IDENT	1643470	B
								SCALE —	SHEET 1 OF 2


REVISIONS
ZONE LTR DESCRIPTION DATE APPD
A PER ECN M1174 04-18-77 TRL
B PER ECN M1953 0DEC79 BAP
ADDED SHT 2 & NOTES FOR TYPE V CONTROLS
A1
TB1 CONTROLLER TB2
HEATER PWR IN
PROBE
COOL
HEATER ON
NEUTRAL
AUX SW Φ
NULL
Φ
HEAT SW ON
SW Φ
AUX Φ
GND
RIBBON CABLE
REMOTE PROGRAM INTERFACE CONNECTOR
P
TB2
W2
THERMOCOUPLE
TYPE J 20 GA IRON-CONSTANTAN
FAILSAFE
S1
DS1
S2
CO2 VALVE
L1
LN2 VALVE
L2
BLOWERS
B1
B2
HEATERS
HR1
HR2
8.75Ω
12 AWG H TEMP
12 AWG
H TEMP
W3
TB1
AUX Φ
AUX SW Φ
NEUTRAL
SW Φ
Φ
HEATER ON
TP
TP
HEATER PWR IN
HEATER SW ON
COOL
FAILSAFE
GND
C1 .05UF
K1
CB 20A
C2 1UF
C3 1UF
120V-2 POLE 3 WIRE-GROUNDING
W
BK
G
PI
CHASSIS GND
PARTITION
TO INNER (WET)
NOTE:
• THIS SHT SHOWS CHAMBER WIRING FOR USE WITH TYPE V CONTROLLER
• SEE SHT 1 FOR TYPE III
6 USED ON CO2 LN2 DUAL MODEL ONLY
5 E7 TO TB1-11 & E9 TO TB1-11 DISCONNECTED AND NOT USED ON CO2 LN2 DUAL MODEL ONLY
4 E7 & E8 DISCONNECTED AND NOT USED ON LN2 MODEL ONLY
3 E9 & E10 DISCONNECTED AND NOT USED ON CO2 MODEL ONLY
2. THICK LINES INDICATE HEAT POWER CIRCUITRY
NOTES:
HIGHEST REFERENCE DESIGNATIONS
REFERENCE DESIGNATIONS NOT USED
ENGINEERING ACTIVITY
DESIGN
DRAFTED L. E. UNTERBERG 1/23/76
CHECKED
APPROV
RELEASE
DELTA DESIGN INC.
TITLE: SCHEMATIC DIAGRAM 120 V CO2 W/LN2 & DUAL OPTIONS
SIZE D
1643470
REV D
SCALE —
SHEET 2 OF 2
MATERIAL
FINISH
DO NOT SCALE DWG
APPLICATION
EFFECTIVITY
NEXT ASSY
SERIAL NO.



ZONE	LTR	REVISIONS DESCRIPTION	DATE	APPR
	A	PER ECNM 1460 BOM 5-25-78	2-78	
	B	PER ECNM 1953 10 DEC 79 ROD ADDED SHT 2 & NOTES FOR TYPE V CONT	12-20	

(R) 1 USED ONLY ON 220V MODEL 3900 WITH UNIVERSAL TEST TRAY OVERRIDE (2 SHTS)

6 USED ON CO_2 LN_2 DUAL MODEL ONLY

5 E7 TO TB1-11 & E9 TO TB1-11 DISCONNECTED AND NOT USED ON CO_2 LN_2 DUAL MODEL ONLY

4 E7 & E8 DISCONNECTED AND NOT USED ON LN_2 MODEL ONLY

3 E9 & E10 DISCONNECTED AND NOT USED ON CO_2 MODEL ONLY

2

1 CAUTION-DO NOT REMOVE F2 UNLESS A PROGRAMMER IS TO BE INSTALLED

NOTES:

(R) NOTE:
- THIS SHT [illegible]
- SEE SHT 2 FOR TYPE V

DASH QTY	NEXT ASSY	USED ON	SERIAL NO	DATE EFF	DWG REV	MATERIAL 1	
APPLICATION			EFFECTIVITY			FINISH 2	

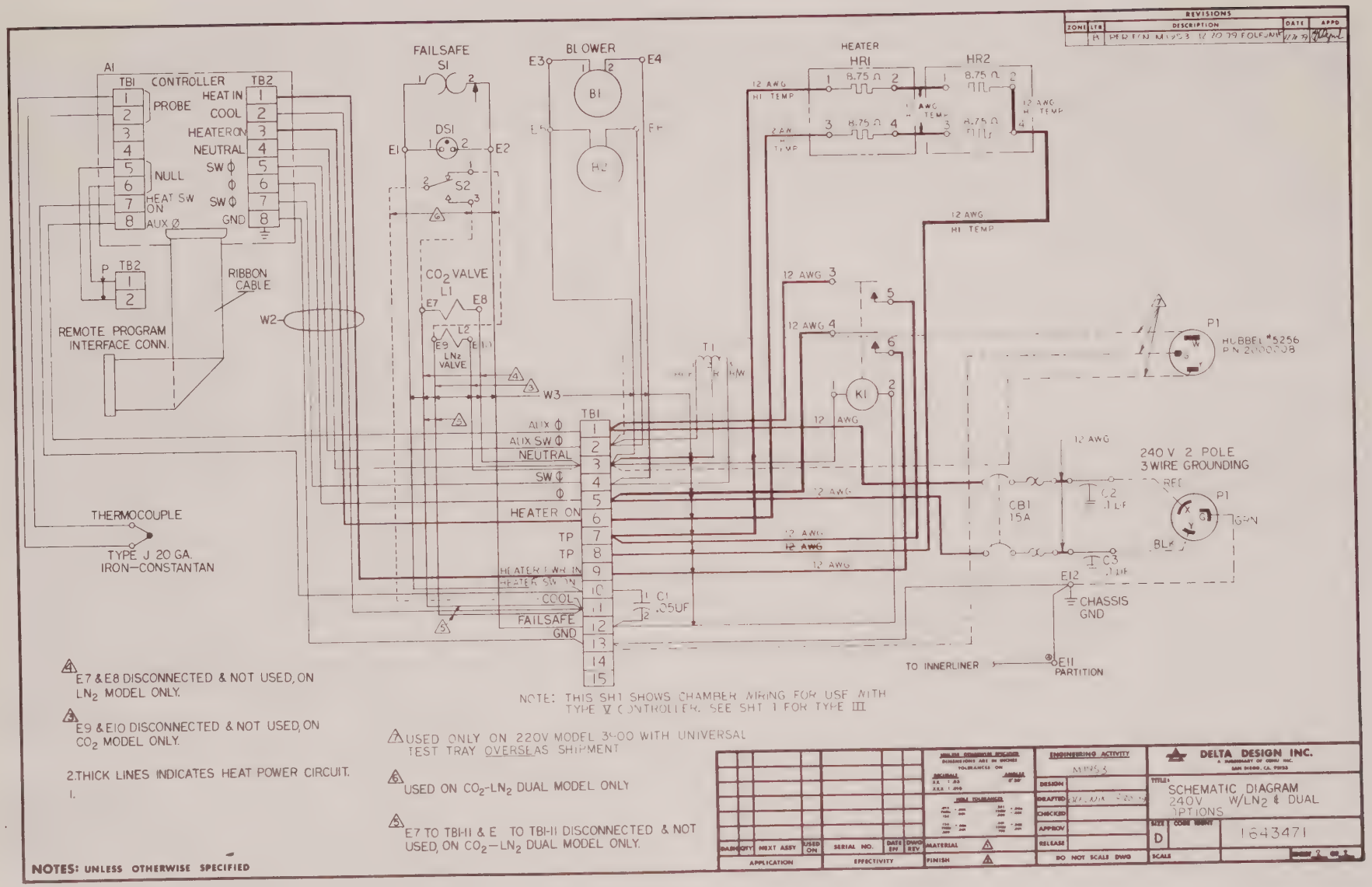
ENGINEERING ACTIVITY
DESIGN
DRAFTED
CHECKED
APPROV
RELEASE
DO NOT SCALE DWG

DELTA DESIGN INC.
A SUBSIDIARY OF CONU INC
9730 GRANITE HILLS DR SAN DIEGO, CA. 92123 - TEL (714) 292-9000

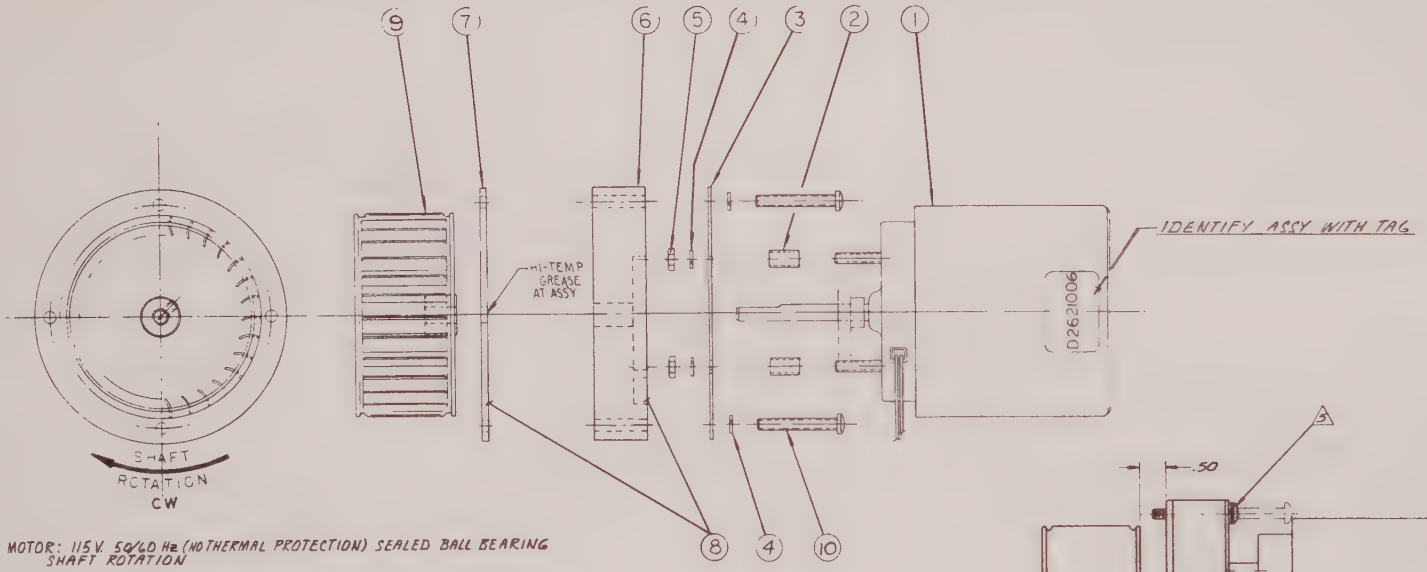
TITLE: SCHEMATIC DIAGRAM 240V W/LN2 & DUAL OPTIONS

SIZE D | CODE IDENT | 1643471 | B

SCALE | SHEET 1 OF 2


REVISIONS
ZONE | LTR | DESCRIPTION | DATE | APPD
A | PER E/N M1953 & 10-79 FOLFONE
A1
TB1 CONTROLLER TB2
PROBE
HEAT IN
COOL
HEATER ON
NEUTRAL
SW Φ
Φ
SW Φ
GND
NULL
HEAT SW ON
AUX Φ
P TB2
RIBBON CABLE
REMOTE PROGRAM INTERFACE CONN.
W2
THERMOCOUPLE
TYPE J 20 GA. IRON-CONSTANTAN
FAILSAFE
S1
DS1
E1
E2
S2
CO2 VALVE
L1
E7
E8
L2
E9
E10
LN2 VALVE
W3
BLOWER
E3
E4
B1
E5
E6
M2
HEATER
HR1
HR2
8.75 Ω
12 AWG HI TEMP
2 AWG HI TEMP
T1
K1
P1
HUBBEL #5256
P/N 2000008
240 V 2 POLE 3 WIRE GROUNDING
CB1 15A
C2 .1 UF
C3 .1 UF
RED
GRN
BLK
E12
CHASSIS GND
TO INNERLINER
E11
PARTITION
TB1
AUX Φ
AUX SW Φ
NEUTRAL
SW Φ
Φ
HEATER ON
TP
TP
HEATER SW IN
HEATER SW IN
COOL
FAILSAFE
GND
C1 .05UF
NOTE: THIS SHT SHOWS CHAMBER WIRING FOR USE WITH TYPE V CONTROLLER. SEE SHT 1 FOR TYPE III
4 E7 & E8 DISCONNECTED & NOT USED, ON LN2 MODEL ONLY.
3 E9 & E10 DISCONNECTED & NOT USED, ON CO2 MODEL ONLY.
2. THICK LINES INDICATES HEAT POWER CIRCUIT.
1.
1 USED ONLY ON 220V MODEL 3400 WITH UNIVERSAL TEST TRAY OVERSEAS SHIPMENT
6 USED ON CO2-LN2 DUAL MODEL ONLY
5 E7 TO TB1-11 & E TO TB1-11 DISCONNECTED & NOT USED, ON CO2-LN2 DUAL MODEL ONLY.
NOTES: UNLESS OTHERWISE SPECIFIED
ENGINEERING ACTIVITY
M1953
DESIGN
DRAFTED
CHECKED
APPROV
RELEASE
DO NOT SCALE DWG
DELTA DESIGN INC.
SAN DIEGO, CA. 92123
TITLE: SCHEMATIC DIAGRAM 240V W/LN2 & DUAL OPTIONS
SIZE D
CODE IDENT
1643471
SCALE

ZONE	LTR	REVISIONS DESCRIPTION	DATE	APPROVED
	A	PER ECN M1401 5-7-78 BGM REVISED NOTE 3		



1.) MOTOR: 115V 50/60 Hz (NO THERMAL PROTECTION) SEALED BALL BEARING SHAFT ROTATION

2.) IMPELLER: REVCOR #0381-187S (CCW ROTATION) ALTER PER BIG32186

3.) RTV ITEM 7 TO ITEM 6: ATTACH ITEM 3 (MOTOR PLATE) TO ITEM 1 (MOTOR) USING HARDWARE, THEN RTV TO ITEM 6

4.) BLOWER MOTOR ASSY RATED AT 140 C.F.M. AIR MOVEMENT, NOM.

A TAPE ITEMS 4 & 10 IN PLACE TO PREVENT BEING JARRED LOOSE BEFORE INSTALLING ON CHAMBER.

NOTES:

QTY REQ'D	NOMENCLATURE OR DESCRIPTION	CODE IDENT	IDENTIFYING NUMBER	SPECIFICATION	MATERIAL OR NOTE	ITEM NO.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± 1/64, DECIMALS .XX ± .010, .XXX ± .005, ANGLES ± 1°/2°

MATERIAL

FINISH

	BY	DATE
DESIGN	L. ELLIS	2/3/70
DRAFTED	L. ELLIS	2/3/70
CHECKED		
APPROV		

DELTA DESIGN INC.
4000 FLETCHER FREWY
LA MESA CALIF 92041
TEL A/C 714 465-9181

TITLE: 50/60 Hz BLOWER MTR. ASSEMBLY CW SHAFT ROTATION

MODEL NO.	SIZE	CODE IDENT NO.	DRAWING NO.	REV LTR
STD PART	D		2621006	A

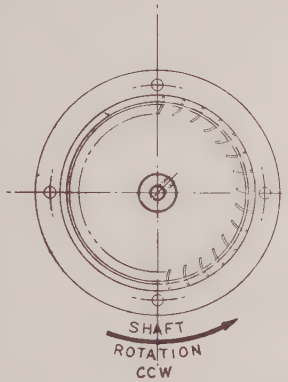
PART NO. 2621006 SCALE FULL SHEET 1 OF 1

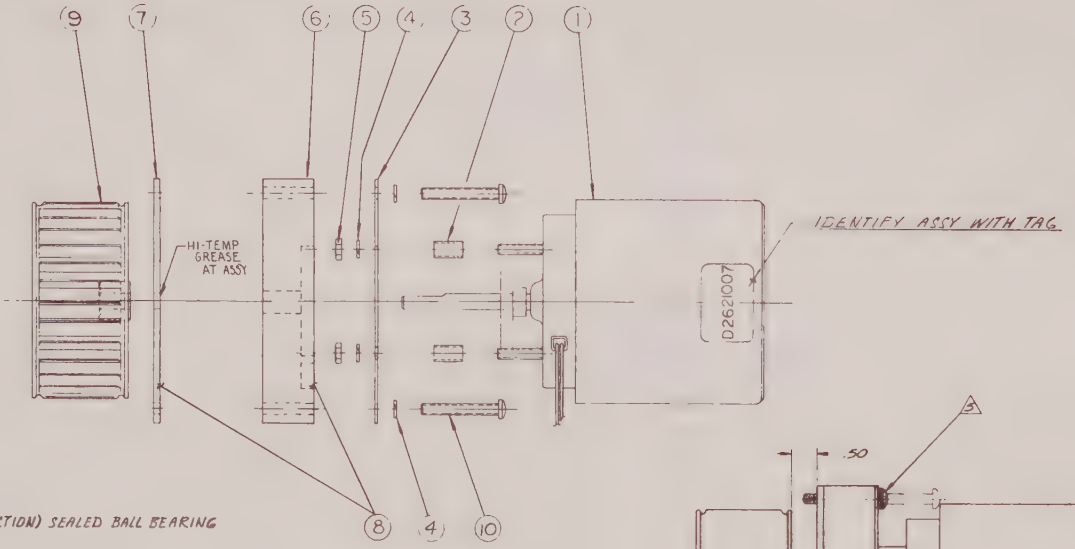
MULTI-USAGE STD 2-3-70 W/C

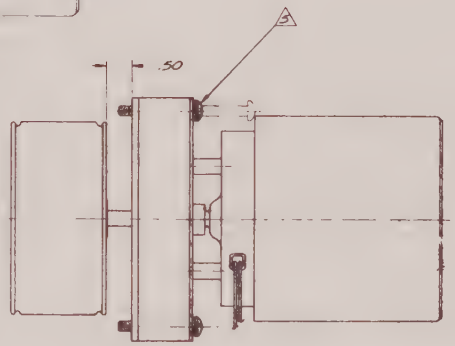
NEXT ASSY	USED ON	SERIAL NOS.	DATE EFF	DWG REV. LTR
APPLICATION		EFFECTIVITY		

BLUE CARD

ZONE	LTR	REVISIONS DESCRIPTION	DATE	APPROVED
	A	PER ECN 1401 REVISED NOTE 5 BGM 4-17-78	5-4-78	







1) MOTOR: 115 V. 50/60 Hz (NO THERMAL PROTECTION) SEALED BALL BEARING SHAFT ROTATION

2) IMPELLER: REVCOR ™ 9381-187 S (CW. ROTATION) ALTER PER B1632185

3) RTV ITEM 7 TO ITEM 6, ATTACH ITEM 3 (MOTOR PLATE) TO ITEM 1 (MOTOR) USING HARDWARE, THEN RTV TO ITEM 6

4) BLOWER MOTOR ASSY RATED AT 140 C.F.M. AIR MOVEMENT, NOM.

A TAPE ITEMS 4 & 10 IN PLACE TO PREVENT BEING JARRED LOOSE BEFORE INSTALLING ON CHAMBER.

NOTES:

QTY REQ'D	NOMENCLATURE OR DESCRIPTION	CODE IDENT	IDENTIFYING NUMBER	SPECIFICATION	MATERIAL OR TYPE

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS .XX ± .010 .XXX ± .005 ANGLES ± 1/2°

MATERIAL

FINISH

	BY	DATE
DESIGN	L. ELLIS	
DRAFTED	L. ELLIS	
CHECKED	Harris	
APPROV		

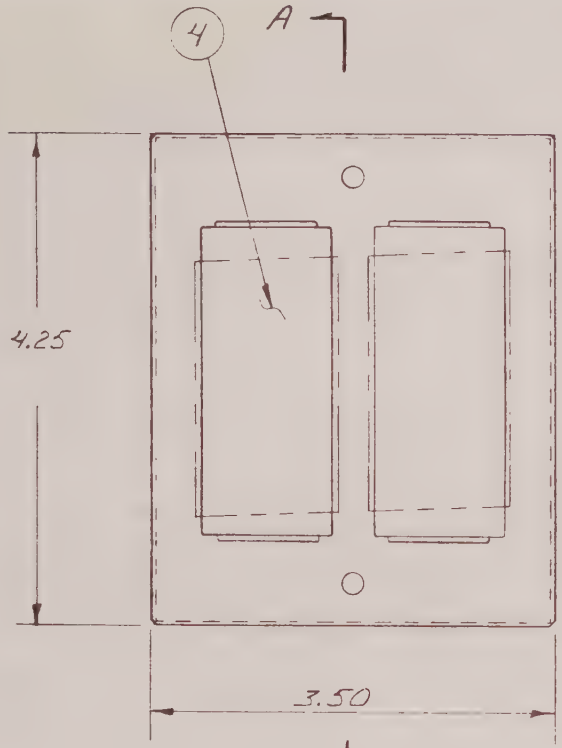
DELTA DESIGN, INC.
8520 PLATFORM ROW
LA MESA, CALIF. 92041
TEL. A/C (714) 465-4444

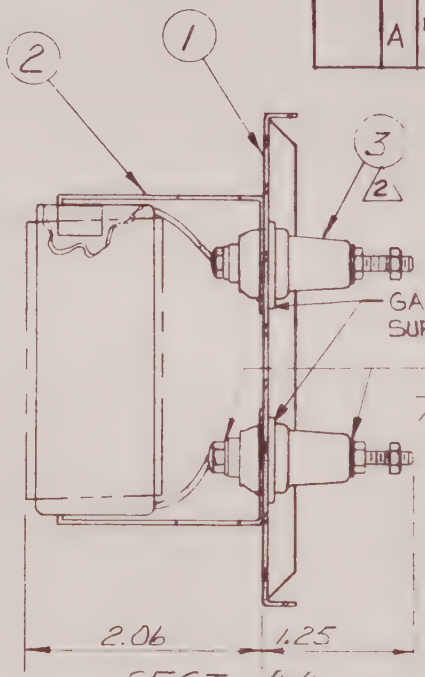
50/60 Hz BLOWER MTR ASSEMBLY
CCW SHAFT ROTATION

MODEL NO.	SIZE	CAGE IDENT	DRAWING NO.	
STD PART	D		2621007	A
ITEM NO. 2621007				1 OF 1

MULTI-USAGE	STD		5-3-78	M/C
NEXT ASSY	USED ON	SERIAL NOS	DATE EFF	DWG REV. LTR
APPLICATION		EFFECTIVITY		

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	PER ECN M1897 J.RAMER 10-15-72 REMOVED ITEM #5 (WAS ASBESTOS INSTEAD OF CORK GASKET)	10-16-9	





GASKETS (CORK) 4 PLACES SUPPLIED WITH ITEM NO. 3

FLAT WASHERS SUPPLIED W/ ITEM 3

DASH	HTR RES
-001	8.75 Ω
-002	15.0 Ω
-003	17.5 Ω
-004	20.0 Ω

SECT. A-A

P/L "B" SIZE

QTY REQ'D	NOMENCLATURE OR DESCRIPTION	CODE IDENT	IDENTIFYING NUMBER	SPECIFICATION	MATERIAL OR NOTE	ITEM NO

1. ALL DIM. ARE REF ONLY.

NOTES:

UNLESS OTHERWISE SPECIFIED
THE FOLLOWING APPLIES
BREAK ALL SHARP EDGES .005
MAX. SURFACE ROUGHNESS 125 RMS
THDS. INT. CL 2B, EXT. CL 2A

NEXT ASSY	USED ON	SERIAL NOS	DATE EFF	DWG REV LTR
	MULTIPLE STD USAGE			
APPLICATION		EFFECTIVITY		

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 64 ANGLES ± ½°
DECIMALS .XX ± .010
.XXX ± .005
MATERIAL
FINISH

	BY	DATE
DESIGN		
DRAFTED	A. NAPP	7-6-72
CHECKED	[illegible]	7-6-72
APPROV	[illegible]	7-6-72

DO NOT SCALE DRAWING

PART NO NOTE E

DELTA DESIGN INC.
8000 FLETCHER PKWY.
LA MESA, CALIF. 92041
TEL A/C (714) 465-4141

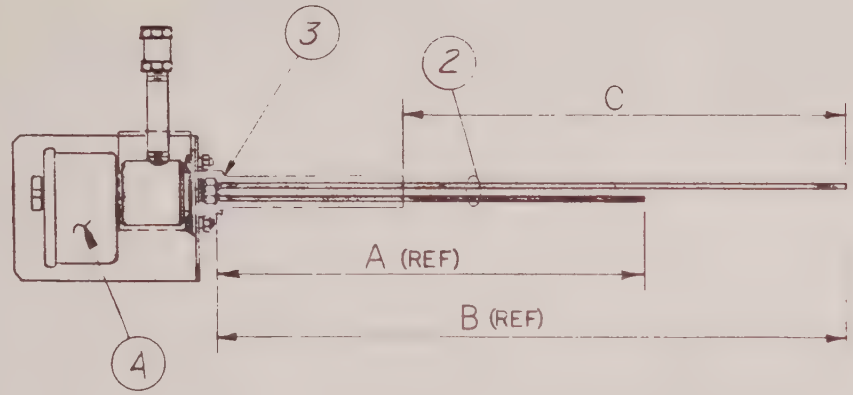
TITLE: HEATER ASSY

SIZE	CODE IDENT NO	DRAWING NO	REV LTR
B		2622524	

SCALE FULL SHEET 1 OF 1

BLUE CARD

REVISIONS				
ZONE	LTR	DESRIPTION	DATE	APPD
	A	PER ECN 1365 BGM 3-30-78 ITEM 4 WAS ITEM 1, ITEM 4 REDRAWN FOR ACCURACY	4-14-78	
	B	PER ECN M1521 BGM 7-21-78 ITEM 2 UPDATED, A, B, +C DIMS IN TABULATION BLOCK CHANGED, SEE ECN	7-31-78	



DASH NO	A	B	C	USED ON
-001	16.75	22.25	14.25	3900 B
-002	17.00	24.25	16.25	3900 R
-003	16.25	25.75	17.75	6400
-004				8000
-005				8000
-006	17.25	17.25	13.25	4100
-007				
-008				
-009				
-010				

DASH NO	A	B	C	USED ON
-011				
-012				
-013				
-014				
-015				
-016				
-017				
-018				
-019				
-020				

⚠ FINISH (IF APPLICABLE)

⚠ MATL (IF APPLICABLE)

NOTES: UNLESS OTHERWISE SPECIFIED

DASH	QTY	NEXT ASSY	USED ON	SERIAL NO.	DATE EFF	DWG REV
		MULTIPLE		STD USAGE		
APPLICATION				EFFECTIVITY		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
DECIMALS: .XX ± .03, .XXX ± .010
ANGLES: 0° 30'

HOLE TOLERANCES

MATERIAL ⚠
FINISH ⚠

ENGINEERING ACTIVITY	
DESIGN	
DRAFTED	KNAPP 4-3-78
CHECKED	[illegible]
APPROV	Hanna 4-6-78
RELEASE	
DO NOT SCALE DWG	

DELTA DESIGN INC.
A SUBSIDIARY OF CONTROL DATA CORP.
8725 KEARNY VILLA RD SAN DIEGO, CA. 92123 - TEL (714) 292-5000

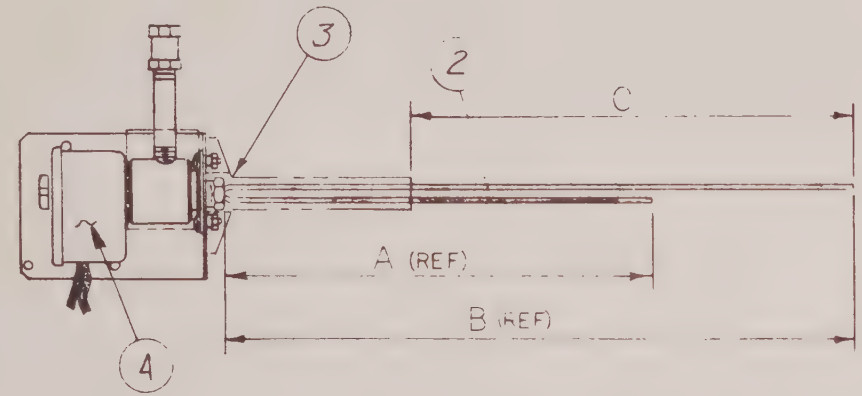
TITLE: CO_2 ASSY (900 PSI) DUAL STEM

SIZE	CODE IDENT	
B		2618018

SCALE 1/2 X

SHEET 1 OF 1

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPD
	A	PER ECN 1365 BGM 3-30-78 VALVE ASSY (ITEM 4) REDRAWN, ITEM 4 WAS 1	4-14-78	
	B	PER ECN M1521 BGM 7-21-78 ITEM 2 UPDATED, A, B, + C DIMS IN TABULATION BLOCK CHANGED, SEE ECN	7-31-78	



DASH NO	A	B	C	USED ON
-001	16.75	22.25	14.25	3900 B
-002	17.00	24.25	16.25	3900 R
-003	16.25	25.75	17.75	6400
-004				8000
-005				8000
-006	17.25	17.25	13.25	4100
-007				
-008				
-009				
-010				

DASH NO	A	B	C	USED ON
-011				
-012				
-013				
-014				
-015				
-016				
-017				
-018				
-019				
-020				

⚠ FINISH (IF APPLICABLE)

⚠ MATL (IF APPLICABLE)

NOTES: UNLESS OTHERWISE SPECIFIED

DASH	QTY	NEXT ASSY	USED ON
		MULTIPLE	STD USAGE

APPLICATION

SERIAL NO. | DATE EFF | DWG REV

EFFECTIVITY

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
DECIMAL: XX ± .03, XXX ± .010
ANGLES ± 30'
HOLE TOLERANCES

MATERIAL ⚠

FINISH ⚠

ENGINEERING ACTIVITY

DESIGN	
DRAFTED	K.N.HPP 4-6-78
CHECKED	[illegible] 4-6-78
APPROV	[illegible] 4-6-78
RELEASE	

DO NOT SCALE DWG

DELTA DESIGN INC.
A SUBSIDIARY OF CONNU INC
3725 KEARNY VILLA RD SAN DIEGO, CA 92123 - TEL 714: 292-9000

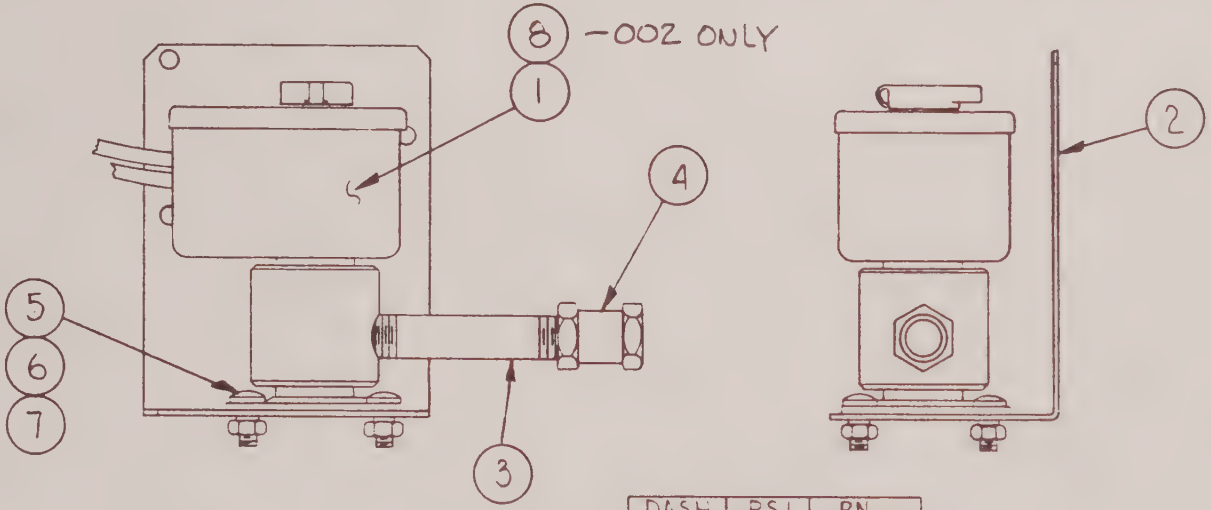
TITLE: CO_2 ASSY (300 PSI) DUAL STEM

SIZE B | CODE IDENT | 2618017

SCALE 1/2 X | SHEET 1 OF 1

BLUE CARD

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPD



DASH	PSI	PN
-001	900	1800117
-002	300	1800105

⚠ FINISH (IF APPLICABLE)

⚠ MATL (IF APPLICABLE)

NOTES: UNLESS OTHERWISE SPECIFIED

DASH	QTY	NEXT ASSY	USED ON
		MULTI-USAGE	

APPLICATION

SERIAL NO. | DATE EFF | DWG REV

EFFECTIVITY

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
DECIMALS: .XX ± .03; .XXX ± .010
ANGLES: 0° 30'

HOLE TOLERANCES

MATERIAL ⚠

FINISH ⚠

ENGINEERING ACTIVITY	
DESIGN	
DRAFTED	BGM 3-24-78
CHECKED	
APPROV	
RELEASE	

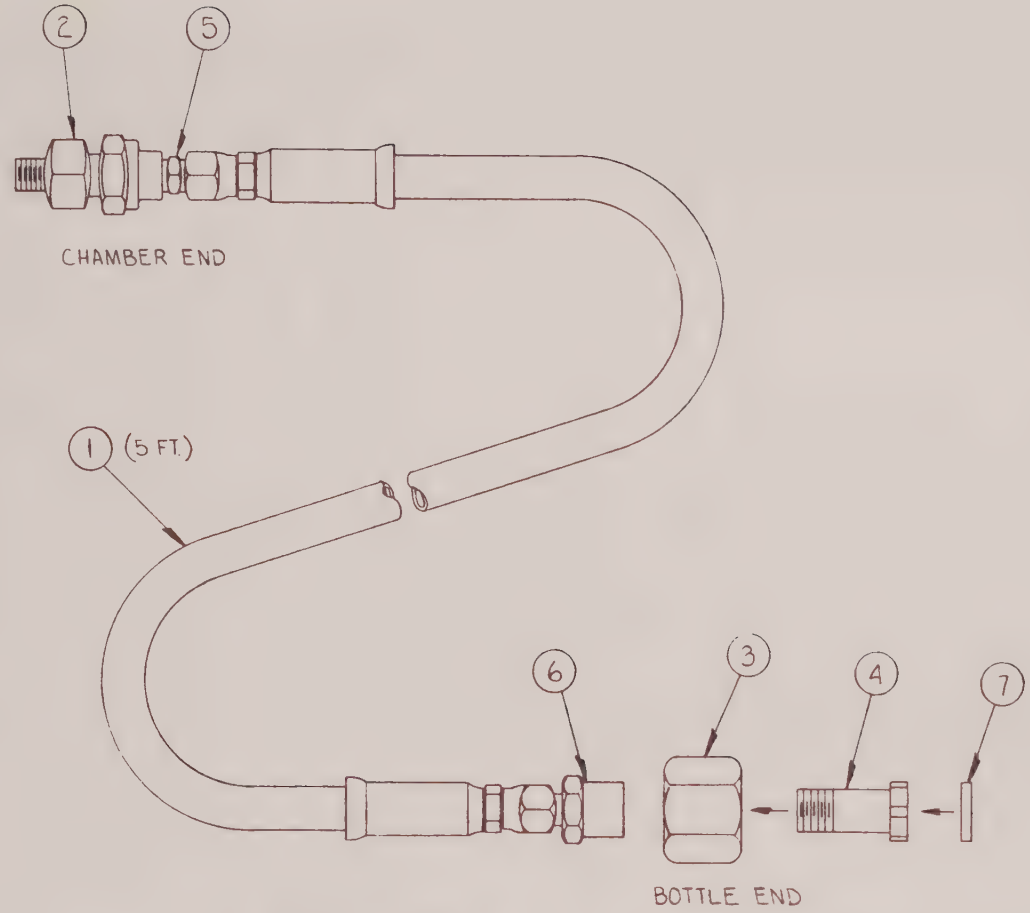
DO NO SCALE DWG

DELTA DESIGN INC.
A SUBSIDIARY OF CONU INC.
SAN DIEGO, CA. 92123

TITLE: CO_2 VALVE & BRACKET ASSY

SIZE B | CODE IDENT | 1647407

SCALE 1/1 | SHEET 1 OF 1



001	1	1640111	8000								
001	1		7650								
001	1	2636342	6400								
001	1	2635601	5700								
001	1	2636283	3900								
001	1	2635402	2850								
001	1	2605110	2300								
DASH	QTY	NEXT ASSY	USED ON	SERIAL NO.	DATE EFF	DWG REV	MATERIAL ⚠				
APPLICATION				EFFECTIVITY			FINISH ⚠				

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
DECIMALS: .XX ± .03; .XXX ± .010
ANGLES: 0° 30'
HOLE TOLERANCES

ENGINEERING ACTIVITY: ECN M1622

DESIGN: B NIELSEN 10-2-88
DRAFTED:
CHECKED:
APPROV:
RELEASE:
DO NOT SCALE DWG

DELTA DESIGN INC.
A SUBSIDIARY OF CONU INC.
SAN DIEGO, CA. 92123

TITLE: HOSE SHIP KIT

SIZE: C | CODE IDENT | 2618020

SCALE 1/1 | SHEET __ OF __

⚠ FINISH (IF APPLICABLE)

⚠ MATL (IF APPLICABLE)

NOTES: UNLESS OTHERWISE SPECIFIED

BLUE CARD

INDEX OF ASSEMBLIES - MODEL 3900 CHAMBER

	TITLE	SIZE & NO.	SHEET
1.	Innerliner Assembly	D2636288	1
2.	Innerliner Spotweld Assembly	D2636289	1
3.	Door Jamb Assembly	D2603156	1
4.	Sheet, Plenum Assembly	D2600223	1
5.	Top Sheet Assembly	D2636291	2
6.	Left Sheet Assembly	D2600112	2
7.	Right Sheet Assembly	D2600111	2
8.	Baffle Assembly	C2600225	3
9.	Scroll	D2635606	3
10.	Can Assembly	B2632196	3
11.	Rear Panel Assembly	D2630571	4
12.	Bottom Panel Assembly	D2600116	4
13.	Right Panel Assembly	D2636287	4
14.	Partition Panel Assembly	D2636290	5
15.	Bezel Assembly	C2600100	5
16.	Weld Assembly - Tube Guide	B1640309-001	5
17.	Thermoswitch Assembly (S1)	B2602503	6
18.	Blower Motor Assembly (B1)	D2621006	6
19.	Blower Motor Assembly (B2)	D2621007	7
20.	Heater Assembly (HR1, HR2)	B2622524-001	7
21.	Heater Element Assembly	B2635875-001	7
22.	CO_2 Assembly, Dual Stem (L1)	B2618018-001	8
23.	CO_2 Injector Assembly	B1647844-002	8
24.	CO_2 Valve & Bracket Assembly	B1647407-001	8
25.	Cable Assembly (W1)	A2635264-005	9
26.	Cable Assembly (W2)	A2635265-005	9
27.	Cable Assembly (125V) (W3)	A2635833-003	9

	TITLE	SIZE & NO.	SHEET
28.	LN_2 Injector Assembly	C2619064-001	9
29.	Hose Ship Kit	C2618020-001	11
30.	Capacitor Mod. (C2, C3)	A2635048	11
31.	CO_2 Assy, Dual Stem (300 PSI)	B2618017-001	12
32.	Injector Assy, CO_2 Dual Stem	B1647844-001	12
33.	CO_2 Valve & Bracket Assy	B1647407-002	12
34.	Plug Mod.	B2600409-001	12
35.	Interconn. Assy - Type V Controlr with IEEE-488	D1650223	Multi-Usage
36.	Chamber Type V Controlr Retrofit 3900	D1650240	13

PL 2636283 REV ____ SHT 1 OF 13

DESCRIPTION TOP ASS'Y 3900 CHAMBER

NEXT ASSY END ITEM BY ARENA CK'D ____ APPD ____

REV	ECN	DATE	BY	APP
J	1521	7-27		
K	1621	10-4-7		
L	1785	11-7-8		
M	1919	2-5-8		

DELTA DESIGN
5725 KEARNY VILLA RD
SAN DIEGO, CALIF

JOB NO ____ S.O NO ____
QTY ____ PROM DATE ____ ACT ____
RUN * ____ MACH ____

ITEM NO	ASSY & QTY -001	-002	-003	-004	INDENTURE	SIZE	DRAWING NO.	REV	DESCRIPTION	MFG OR MFG NO	STOCK OR PART NO
00	X					D	2636283	K	CHAMBER ASS'Y., 3900		2636283
00	REF					D	1643470	A	SCHEMATIC DIAGRAM 120V		
00	REF					D	1643471		SCHEMATIC DIAGRAM 240V		
~~00~~	~~REF~~					~~C~~	~~1635836~~		~~120 VAC TO 240 VAC CONVERSION~~		~~2635836~~
00	REF					D	1643453	B	CO_2 & LN_2 CHAMBER CONVERSION ASS'Y.		1643453-001
00	REF					D	2639167	C	CO_2 & LN_2 DUAL CONVERSION		2639167
~~00~~	~~REF~~					~~C~~	~~1640222~~	A	~~LN_2 INSTAL. ASS'Y., VALCOR VALVE (IN FIELD)~~		~~1640222-007~~
00	REF					P/L	1648289		TOP ASSY, TYPE III CONTROLER		
00	REF					D	1648384		ARTICULATED HINGE		1648384-001
00	REF					P/L	1649919		VDE REQUIREMENTS		1649919-001
00	REF					D	1650223		INTERCONNECT ASSY TYPE II CONTROLLER		MULTI-USAGE
00											
00											
01	1					D	2636288	B	INNERLINER ASSY		2636288
01	1					D	2636289	A	INNERLINER SPOTWELD ASS'Y		2636289
00											
00											
01	1					D	2603156	C	JAMB ASS'Y., DOOR		2603156
00											
01	2					C	1600402	C	SHEET, JAMB LEFT & RIGHT		1600402
02	2					C	1600403	C	SHEET, JAMB TOP & BOTTOM		1600403
03											
04											
02	1					D	2600223	B	SHEET, PLENUM ASS'Y		2600223
00											
00											
01	1					D	1600110	C	SHEET, BOTTOM INNERLINER		1600110
02	2					C	1600106	B	SHEET, DEFLECTOR, RIGHT		1600106-002
03	2					C	1600106	B	SHEET, DEFLECTOR, LEFT		1600106-001
04	3					B	1602965	B	SPACER, SWAGED	1602965-001	4100085
05	1					B	1634780	E	TUBE, SPACER		1634780-002
06	1					B	1636321	A	TUBE, GUIDE		1636321-002
07	1					B	1634780	E	TUBE, GUIDE		1634780-003

JOB QTY	ALL	QTY REC	FAB CD	PURCHASING PO NO	QTY DUE	REC'D	MANUFACTURE ACT STD HRS	EST ACT COM	COMM	PLATE/PAINT IN	OUT	APP'A

NOTES: ⚠ THESE DWGS. ARE FOR OPTIONAL EQUIPMENT AND ARE NOT PART OF BASIC CHAMBER.

P/L 2636283

PL 2636283 REV ____ SHT 2 OF 13

DESCRIPTION TOP ASS'Y 3900 CHAMBER

NEXT ASSY END ITEM BY ARENA CK'D ____ APPD ____

REV ECN DATE BY APP
J J M1947 5-2-3 RRP

DELTA DESIGN
5725 KEARNY VILLA RD
SAN DIEGO, CALIF

JOB NO ____ S.O NO ____
QTY ____ PROM DATE ____ ACT ____
RUN * ____ MACH ____

ITEM NO	ASSY & QTY -001	-002	-003	-004	INDENTURE	SIZE	DRAWING NO.	REV	DESCRIPTION	MFG OR MFG NO	STOCK OR PART NO.	JOB QTY	ALL	QTY REC	FAB CD	PURCHASING PO NO	QTY	DUE REC	MANUFACTURE ACT STD HRS	EST ACT COM	PLATE/PAINT IN	OUT	AREA
08	1					C	1600114		SHEET, PLENUM INNERLINER		1600114-001												
09																							
10																							
11																							
12																							
03	1					D	2636291	B	SHEET, TOP ASS'Y.		2636291												
00																							
00																							
01	1					D	2636291	B	SHEET, TOP .032 THK SST COND. "A" FIN. 2B	SHT. TYPE 302-304	1636291-001												
02	1					A	1600029	D	SHEET, TOP SUPPORT		1600029-003												
03	2					B	1602965	B	STANDOFF, SWAGE	1602965-002	4100095												
04	4								* 8-32 WELDNUT		1500185												
05																							
06																							
04	1					D	2600112	E	SHEET, LEFT ASS'Y.		2600112												
00																							
00																							
01	1					D	2600112	E	SHEET, LEFT .032 THK SST COND. "A" FIN. 2B	SHT. TYPE 302-304	1600112-001												
02	1					B	1634771	C	TUBE, CO_2 VENT		1634771-004												
03	1					B	1630007	C	RETAINER, VENT TUBE		1630007												
04																							
05																							
05	1					D	2600111	D	SHEET, RIGHT ASS'Y.		2600111												
00																							
00																							
01	1					D	2600111	D	SHEET, RIGHT .032 THK SST COND. "A" FIN. 2B	SHT. TYPE 302-304	1600111-001												
02	1					B	1640099		BRACKET, FAILSAFE		1640099												
03																							
04																							
06	2					B	1634780	E	TUBE, GUIDE		1634780-004												

NOTES:

P/L 2636283

PL 2636283 REV ____ SHT 3 OF 13
DESCRIPTION TOP ASS'Y 3900 CHAMBER
NEXT ASSY END ITEM BY ARENA CK'D ____ APPD ____

REV ECN DATE BY APP

DELTA DESIGN
5725 KEARNY VILLA RD
SAN DIEGO, CALIF

JOB NO ____ S O NO ____
QTY ____ PROM DATE ____ ACT ____
RUN * ____ MACH ____

ITEM NO	ASSY & QTY -001	-002	-003	-004	INDENTURE	SIZE	DRAWING NO.	REV	DESCRIPTION	MFG OR MFG NO	STOCK OR PART NO	JOB QTY	ALL	QTY REC	FAB CD	PURCHASING PO NO	QTY DUE	REC'D	MANUFACTURE ACT EST HRS	ACT COM	PLATE/PAINT IN	OUT	AREA
07	1				B	1634774		TUBE, PROBE GUIDE		1634774-002												
08																						
09																						
10																						
02	1				C	2600225	C	BAFFLE ASS'Y.		2600225												
00																						
00																						
01	1				C	2600225	C	SHEET, BAFFLE UPPER	SHT. TYPE 302-304	1600225-001												
								.032 THK. SST COND. A" FIN. 2B														
02	1				C	2600225	C	SHEET, BAFFLE REAR	SHT. TYPE 302-304	1600225-002												
								.032 THK. SST COND. A" FIN. 2B														
03	1				C	2600225	C	SHEET, DEFLECTOR	SHT. TYPE 302-304	1600225-003												
								.032 THK. SST COND A" FIN. 2B														
04																						
05																						
06																						
03	2				D	2635606		SCROLL	2635606	2100701												
								(HOUSING ASS'Y., BLOWER WHEEL)														
00																						
00																						
01	1							HOUSING, BLOWER WHEEL		2100701												
02	4							WELDNUT	CHIC NUT XN1713	1500189												
03																						
04																						
04																						
05	2				B	2632196	D	CAN ASS'Y.	MULTI-USAGE	2632196-002												
00																						
00																						
~~01~~	~~1~~				~~B~~	~~1632350~~	~~C~~	~~CAN~~		~~1632350-002~~												
02																						
03																						
04	~~2~~				~~A~~	~~1631838~~	~~A~~	~~TAB~~		~~1631838~~												

NOTES:

P/L 2636283

PL 2636283 REV ____ SHT 4 OF 13

DESCRIPTION TOP ASS'Y 3900 CHAMBER

NEXT ASSY END ITEM BY ARENA CK'D ____ APPD ____

REV ECN DATE BY APP

DELTA DESIGN
5725 KEARNY VILLA RD
SAN DIEGO, CALIF

JOB NO ____ S.O NO ____
QTY ____ PROM DATE ____ ACT ____
RUN * ____ MACH ____

ITEM NO	ASSY & QTY -001	-002	-003	-004	INDENTURE	SIZE	DRAWING NO.	REV	DESCRIPTION	MFG OR MFG NO	STOCK OR PART NO.	JOB QTY	AUX	QTY REC	FAB CD	PURCHASING PO NO	QTY	DUE	REC'D	MANUFACTURE ACT EST ACT STD HRS	COM	COM	PLATE/PAINT IN	OUT	AREA
~~05~~	1								~~GROMMET~~		~~1500026~~													
06																								
07																								
08																								
06	2				B	1600015			RING, SCROLL		1600015													
07	5								* 6-32 UNC × .38 PHP-MS		6806323-804													
08	4								* 6 × .38 PHP-SMS		6906380-400													
09	8								* 6 × .50 PHP-SMS		6906120-400													
10																								
11																								
12																								
13																								
14																								
15																								
02	1				D	1603080		H	PANEL, FRONT		1603080													
03	1				D	2630571		E	PANEL ASS'Y., REAR		2630571													
00																								
01	1				D	2630571		E	PANEL, REAR		1630571													
02	6								* 6-32 RIVNUT, CSK. HD.	A6-106	1700037													
03	2								* 6-32 PRESSNUT	S632-6	1700029													
04																								
05																								
04	1				D	1600118		G	TOP PANEL		1600118													
05	1				D	2600116		D	PANEL ASS'Y., BOTTOM		2600116													
00																								
01	1				D	2600116		D	PANEL, BOTTOM .062 AL ALY FINEBARK TEXTURED	SHT. 3003-H14	1600116													
02	4								¼-20 RIVNUT, FLT. HD.	B.F. GOODRICH A25-B0	1700014													
03	4								* 6-32 RIVNUT, CSK HD.	B.F. GOODRICH A6-106	1700037													
04																								
05																								
06	1				D	2636287			PANEL ASS'Y, RIGHT		2636287													
00																								

NOTES:

P/L 2636283

P.L. 2636283 REV ____ SHT 5 OF 13

DESCRIPTION TOP ASS'Y 3900 CHAMBER

NEXT ASSY END ITEM BY V. A. CK'D ____ APPD ____

REV ECN DATE BY APP

DELTA DESIGN
5725 KEARNY VILLA RD
SAN DIEGO, CALIF

JOB NO ____ S O NO ____
QTY ____ PROM DATE ____ ACT ____
RUN * ____ MACH ____

ITEM NO	ASSY & QTY -001	-002	-003	-004	INDENTURE	SIZE	DRAWING NO.	REV	DESCRIPTION	MFG OR MFG NO	STOCK OR PART NO.	JOB QTY	AUL	QTY REC	FAB CD	PURCHASING PO NO	QTY	DUE	MANUFACTURE ACT EST ACT REC'D	HRS	COM	COM	PLATE/PAINT IN	OUT	AREA
00																									
01	1					D	2636287		PANEL, RIGHT SIDE .062 AL ALY	SHT 3003-H14	1636287-001														
									FINEBARK TEXTURED																
02	7								*6-32 RIVNUT, CSK. HD.		1700037														
03	3								*8-32 RIVNUT, CSK. HD.		1700005														
04																									
05																									
07	1					D	1636286	B	PANEL, LEFT		1636286														
08	1					D	2636290	D	PANEL ASS'Y, PARTITION		2636290														
00																									
00	REF					C	1636003	A	ARTWORK, PANEL ASS'Y.																
01	1					D	2636290	D	PANEL, PARTITION .062 AL ALY	SHT. 3003-H14	1636290-001														
									FINEBARK TEXTURED																
02	9								*6-32 RIVNUT, FLT. HD.	BF GOODRICH A6-75	1700003														
03	4								*8-32 RIVNUT, FLT. HD.	E.F. GOODRICH A8-75	1700004														
04																									
05																									
09	1					D	2600100	F	BEZEL ASS'Y		2600100														
00																									
01	1					D	2600100	F	ANGLE BEZEL	(M/F 1636292-001)	1600100-001														
02	1					B	1636292	B	ANGLE, BEZEL		1636292-001														
03	2					B	1636292	B	ANGLE, BEZEL		1636292-002														
04																									
05																									
10	1					A	1602967	D	VENT PLATE, OUTER		1500553														
11	1					A	1602968	D	GASKET, VENT		2400063														
12	1					B	1640309		WELD ASS'Y. - TUBE GUIDE		1640309-001														
00																									
01	1					B	1640309		PLATE 1.25 × 1.25 × 032	304-302 SST	1640309-101														
02	1					B	1640309		TUBE .50 O.D. × .028 WALL × 1.00	304-302 SST	1640309-102														
03																									
04																									
13	2					C	1635605	A	LATCH KEEPER		4100051														

NOTES:

P/L 2636283

P.L. 2636283 REV ____ SHT 6 OF 13

DESCRIPTION TOP ASS'Y 3900 CHAMBER

NEXT ASSY END ITEM BY ARENA CK'D ____ APPD ____

REV ECN DATE BY APP

DELTA DESIGN
5725 KEARNY VILLA RD
SAN DIEGO, CALIF

JOB NO ____ S.O. NO ____
QTY ____ PROM DATE ____ ACT ____
RUN * ____ MACH ____

ITEM NO	ASSY & QTY -001	-002	-003	-004	INDENTURE	SIZE	DRAWING NO.	REV	DESCRIPTION	MFG OR MFG NO	STOCK OR PART NO.	JOB QTY	ALL	QTY REC	FAB CD	PURCHASING P.O. NO	QTY	DUE	REC	MANUFACTURE ACT STD HRS	EST HRS	ACT COM	ACT COM	PLATE/PAINT IN	OUT	AREA
14	A/R				(2)	B	1600091	A	SHIM, KEEPER		1600091-002															
15	1					B	1635880	A	FLEXIDRIVE EXT. MOD.		1635880-001															
16	1								FLEXIDRIVE		1500455															
17	1					B	1635882	A	THERMOMETER 8"	1635882-002	2300011															
18	1					B	1600136	B	CUP THERMOMETER		1600136															
19	1					A	1600076	B	BUSHING THERMOMETER		1600076															
20	2					B	1600004	D	COVER, BLOWER		1600004															
21	8								SPACER		4100093															
22	4								FEET		1500419															
23	A/R								INSULATION, FIBERGLASS		2400025															
24	A/R								INSULATION, PRESSTITE		2400026															
25	2								PLUG (1¼ DIA HOLE)		1700142															
26	1								PLUG (½ DIA HOLE)		3600081															
27	A/R								SPONGE STRIP		2400126															
~~28~~	1					A	1636422		~~LABEL, PRESSURE SENSITIVE~~		1636422															
29	1								CIRCUIT BREAKER 120V (CB1)	AM2-A3-A20-3	1400008															
30	1					B	2602503	C	THERMOSWITCH ASS'Y. (S1)		2300004															
00																										
01	1								THERMOSTAT	VULCAN 1D1C2-4	2300004															
02	1					A	1600007	C	BRACKET		1600007															
03																										
04																										
31	1								LAMP, NEON (DS1)		1400082															
32	1					D	2621006	A	MOTOR, BLOWER (B1)	MULTI-USAGE	2621006-001															

NOTES: (2) USE ONLY AS REQ'D. TO OPTIMIZE SEAL.

P/L 2636283

P.L. 2636283 REV ____ SHT 7 OF 13

DESCRIPTION TOP ASS'Y (3900)

NEXT ASSY END ITEM BY ARENA CK'D ____ APPD ____

REV	ECN	DATE	BY	APP

DELTA DESIGN
5725 KEARNY VILLA RD
SAN DIEGO, CALIF

JOB NO ____ S.O NO ____
QTY ____ PROM DATE ____ ACT ____
RUN * ____ MACH ____

ITEM NO	ASSY & QTY -001	-002	-003	-004	INDENTURE	SIZE	DRAWING NO.	REV	DESCRIPTION	MFG OR MFG NO	STOCK OR PART NO.
33	1				D	2621007	A	MOTOR, BLOWER (B2)	MULTI-USAGE	2621007
34	1							RELAY (K1)		1400218
35	1							CAPACITOR .05uf 400V (C1)		0700520-400
36	2				B	2622524		HEATER ASS'Y (8.75 Ω)	(HR1, HR2)	2622524-001
00										
01	1				B	1635874		SHEET, HEATER		1635874
02	4				B	1635868		STANDOFF, HEATER		1635868
03	2							INSULATOR, CERAMIC	BIRNBACH #458	1500327
04	2				B	2635875		ELEMENT 8.75 Ω		2635875-001
00										
01	1				B	2635875-001		ELEMENT, HEATER 8.75 Ω	LYON RURAL ELECTRIC	2200003
02	2				(3)			STUD	BIRNBACH # 458	1500327

JOB QTY	ALL	QTY REC	FAB CD	PURCHASING P.O. NO	QTY	DUE	REC'D	MANUFACTURE ACT EST ACT HRS.	COM.	COM	PLATE/PAINT IN	OUT	AREA

NOTES: (3) ITEMS 2 & 3 (SHT. 8) ARE SEPARATED FROM STK. ITEM 1500327 AND SUPPLIED TO VENDOR. REMAINING ITEMS ARE RESHELVED.

P/L 2636283

P.L. 2636283 REV ____ SHT 8 OF 12

DESCRIPTION TOP ASSY. 3900 CHAMBER

NEXT ASSY END ITEM BY ARENA CK'D ____ APPD ____

DELTA DESIGN
5725 KEARNY VILLA RD
SAN DIEGO, CALIF

JOB NO. ____ S.O. NO ____
QTY ____ PROM DATE ____ ACT ____
RUN * ____ MACH ____

ITEM NO	ASSY & QTY -001	-002	-003	-004	INDENTURE	SIZE	DRAWING NO.	REV	DESCRIPTION	MFG OR MFG NO	STOCK OR PART NO.	JOB QTY	AUL	QTY REC	FAB CD	PURCHASING PO NO	QTY DUE REC	MANUFACTURE ACT STD HRS	EST ACT COM	COM	PLATE/PAINT IN	OUT	AREA
03	2					(3)	SEE SHT 7		NUT	BIRNBACH # 458	1500327												
04																							
05	4					A	1695867	B	GASKET INSULATOR		1695067												
37	1					B	2618018	B	CO_2 ASS'Y, DUAL STEM (LI)	(4) (5)	2618018-001												
00																							
~~01~~	~~1~~					~~B~~	~~2618005~~		~~CO_2 VALVE WELDMENT ASS'Y.~~		~~2618005-001~~												
02	1					B	1647844		INJECTOR ASSY, CO_2 DUAL STEM		1647844-002												
00																							
~~01~~	~~1~~					~~C~~	~~1618012~~	~~B~~	~~MODIFICATION, PIPE PLUG~~	~~1618012-001~~	~~M/F 3600078~~												
01	1					B	1647397		FITTING, INJECTOR	M/F 3600198	1647397-101												
02	1					B	1647841		TUBE, CO_2 INJECTOR	TYPE 300 SS 1/8 O.D, .020 I.D.	1647841-103												
03	1					B	1647841		TUBE, CO_2 INJECTOR	TYPE 300 SS 1/8 O.D, .020 I.D.	1647841-104												
~~04~~	1					B	1647841		TUBE, CO_2 INJECTOR	TYPE 300 SS 1/8 O.D. .020 I.D.	1647841-111												
05	1								FITTING, INJECTOR		3600197												
03	AR								INSULATION	PRESSTITE TYPE S	2400026												
04	1					B	1647407		CO_2 VALVE & BRACKET ASS'Y.	MULTI-USAGE	1647407-001												
38	1								TERMINAL BLOCK (TB1)		1400572												
~~39~~	~~1~~					~~B~~	~~2635055~~		~~PANEL ASS'Y. SIGNAL (A9)~~		~~2635055~~												
~~40~~	~~1~~					~~C~~	~~2635058~~		~~POWER PANEL ASS'Y. (A2)~~		~~2635058~~												
41	1								PROBE (R1)		2300032												
42	1								~~OUTLET, CONVENIENCE (U1)~~		~~1500083~~												

NOTES: (4) 3900R - USE 2618018-002

(5) CO_2 PSI OPTIONAL PER CUSTOMER PREFERENCE

P/L 2636283

PL 2636283 REV ____ SHT 9 OF 13
DESCRIPTION TOP ASS'Y 3900 CHAMBER
NEXT ASSY END ITEM BY ____ CK'D ____ APPD ____

REV ECN DATE BY APP

DELTA DESIGN
5725 KEARNY VILLA RD
SAN DIEGO, CALIF

JOB NO ____ S.O NO ____
QTY ____ PROM DATE ____ ACT ____
RUN ____ MACH ____

ITEM NO	ASSY & QTY -001	-002	-003	-004	INDENTURE	SIZE	DRAWING NO.	REV	DESCRIPTION	MFG OR MFG NO	STOCK OR PART NO	JOB QTY	AUL	QTY REC	FAB CD	PURCHASING PO NO	QTY	DUE	REC	MANUFACTURE ACT STD HRS	EST ACT COM	COM	PLATE/PAINT IN	OUT	AREA
43	1					A	2695264	A	CABLE ASS'Y. (W1)		2635264-005														
00																									
01	A/R								WIRE, 18 AWG	COHU STOCK	7700618-999														
02	6								SOLDERLESS TERMINAL	(SPADE)	1500055														
03																									
04																									
44	1					A	2635265	B	CABLE ASS'Y. (W2)		2635265-005														
00																									
01	A/R								WIRE 14 AWG	COHU STOCK	7700614-999														
02	A/R								WIRE 18 AWG	COHU STOCK	7700618-999														
03	8								SOLDERLESS TERMINAL	(SPADE)	1500055														
04	2								SOLDERLESS TERMINAL	(SPADE)	1500054														
05																									
06																									
45	1					A	2635833		CABLE ASS'Y. 125V (W3)		2635833-003														
00																									
00	REF					D	1635841	A	SCHEMATIC DIAGRAM - 125V																
01	A/R								WIRE, TEFLON 14 AWG		1500380														
02	A/R								WIRE, TEFLON 18 AWG		1500387														
03																									
04	4								SOLDERLESS TERMINAL	(SPADE)	1500054														
05	2								SOLDERLESS TERMINAL	(SPADE)	1500055														
06	3								SOLDERLESS TERMINAL	(RING)	1500062														
07																									
08																									
~~46~~	~~1~~								~~FUSE 15A~~		~~1400037~~														
47	6								WIRE NUT, SMALL		1500188														
48	1								GROMMET ½		1500032														
49	A/R								CABLE TIE		1500014														
50	A/R								PUSHMOUNT		1500013														
51	1					C	2619064		LN2 INJECTOR ASS'Y.		2619064-001														
00																									
01	1					C	2619064	B	MODIFIED CAP, SWIVEL	2619064-101	M/F 3600093														

NOTES:

P/L 2636283

P/L 2636283 REV ____ SHT 10 OF 13

DESCRIPTION TOP ASS'Y 3900 CHAMBER

NEXT ASSY END ITEM BY ARENA CK'D ____ APPD ____

REV | ECN | DATE | BY | APP

DELTA DESIGN
5725 KEARNY VILLA RD
SAN DIEGO, CALIF

JOB NO ____ S.O NO ____
QTY ____ PROM DATE ____ ACT ____
RUN * ____ MACH ____

ITEM NO	ASSY & QTY -001	-002	-003	-004	INDENTURE	SIZE	DRAWING NO.	REV	DESCRIPTION	MFG OR MFG NO	STOCK OR PART NO	JOB QTY	AUL	QTY REC	FAB CD	PURCHASING PO NO	QTY	DUE	REC	MANUFACTURE ACT STD HRS	EST ACT COM	ACT COM	PLATE/PAINT IN	OUT	AREA
02	2					C	2619064	B	TUBE, LN2 INJECTOR ASS'Y.	.125 O.D. × .016 WALL	2619064-102														
										SST 302-304															
03																									
04																									
52	1								COUPLING, FLEXIDRIVE		4100003														
53	1								NUT		1500735														
54	2					A	1635610		SPACER		1635610														
55	4								* 4 × 1/2 PHP-SMS		6904122-400														
56	22								* 4 × 1/4 FHP-SMS		6904122-100														
57	2								* 4-40 × 5/8 PHP-MS		6804405-824														
58	2						1648659-101		SUPPORT BLOCK - INNER	LINER, 3900 & 5900	1648659-101														
59	30								* 6 × 1/2 PHP-SMS		6906112-400														
60	16								* 6-32 × 1/2 PHP-MS		6806321-224														
61	14								* 6 × 3/4 PHP-SMS		6906342-400														
62																									
63	4								* 8-32 × 3/8 PHP-MS		6808323-824														
64	13								* 8 × 1/2 OHP-SMS		6908122-200														
65	2								* 8-32 × 1/2 OHP-MS		6808321-222														
66																									
67	4								* 10-32 × 5/8 PHP-MS		6810325-824														
68	4								1/4-20 × 3/4 HEX-HC-MS		6814203-427														
69																									
70	5								* 6 SPLIT RING WASHER		6606011														
71	4								1/4-20 FLAT WASHER		6614001														
72	4								* 10 SPLIT RING WASHER		6610011														
73	2								GROMMET		1500026														
74																									
75	A/R								RTV 106	DOW-CORNING	2400003														
~~76~~	~~A/R~~								~~WIRE, TEFLON 14 AWG~~		~~1500380~~														
77	A/R								WIRE, TEFLON 18 AWG		1500387														
78																									
79	2								SOLDERLESS TERMINAL	'RING,	1500062														
80	2								SOLDERLESS TERMINAL	'RECER,	1500047														

NOTES:

P/L 2636283

P.L. 2636283 REV ____ SHT 11 OF 13

DESCRIPTION TOP ASS'Y (3900)

NEXT ASSY END ITEM BY ARENA CK'D ____ APPD ____

REV	ECN	DATE	BY	APP

DELTA DESIGN
5725 KEARNY VILLA RD
SAN DIEGO, CALIF

JOB NO ____ S.O. NO ____
QTY ____ PROM DATE ____ ACT ____
RUN * ____ MACH ____

ITEM NO	ASSY & QTY -001	-002	-003	-004	INDENTURE	SIZE	DRAWING NO.	REV	DESCRIPTION	MFG OR MFG NO.	STOCK OR PART NO.	JOB QTY	AUL	QTY REC	FAB CD	PURCHASING PO NO	QTY DUE	REC'D	MANUFACTURE ACT HRS	EST ACT COM	PLATE/PAINT IN	OUT	AREA
81	1								SOLDERLESS TERMINAL	(RING)	1500055												
82	1								BUTCH PLUG .75 DIA HOLE x.935	O.D.	3600081												
83	2								*10 SPLIT LOCKWASHER		6610010-000												
84	1								*10-32 x 3/4 PHP-MS		6810323-404												
85	4								*10 FLAT WASHER		6610000-000												
86	2								*10-32 HEX NUT		6710320-000												
87	5								*6 x 1/2 PHP-SMS		6906120-400												
88	1					C	2618020		SHIP KIT (SENT WITH 3900)	CHAMBER)	2618020-001												
00																							
01	1								HOSE		3600123												
02	1								STRAINER		1400110												
03	1								NUT		3600120												
04	1								SLEEVE		3600121												
05	1								CONNECTOR		3600004												
06	1								CONNECTOR		3600119												
07	1								WASHER		3600122												
08																							
09																							
10																							
89	1								SOCKET (J1)		2000044												
90	1								TERMINAL BLOCK (TB2)		1400509												
91	1							⚠	CIRCUIT BREAKER 240V (CB1)	AM2-A3-A20-2	1400008												
92	4								*6-32 x 1/4 PHP-SMS		6906140-400												
93	2					A	2635048		CAPACITOR, MOD. (C2, C3)		2635048												
00																							
01	1								CAPACITOR		0800007												
02	1								SWAGE NUT		1700029												
03																							
94	1								STRAIN RELIEF		1500077												
95	8.5 FT.								POWER CORD		1500394												
96	1								PLUG, POWER 120V		2000135												
97	4								SOLDERLESS TERMINAL	(RING,	1500071												
98	1								SOLDERLESS TERMINAL	(RING	1500056												

NOTES:

P/L 2636283

P/L 2636283 REV ____ SHT 12 OF 13

DESCRIPTION TOP ASS'Y 3900 CHAMBER

NEXT ASSY END ITEM BY ARMA CK'D ____ APPD ____

DELTA DESIGN
5725 KEARNY VILLA RD
SAN DIEGO, CALIF

JOB NO ____ S.O NO ____
QTY ____ PROM DATE ____ ACT ____
RUN * ____ MACH ____

ITEM NO	ASSY & QTY -001	-002	-003	-004	INDENTURE	SIZE	DRAWING NO.	REV	DESCRIPTION	MFG OR MFG NO	STOCK OR PART NO	JOB QTY	AUX	QTY REQ	FAB CD	PURCHASING P.O. NO	QTY DUE	MANUFACTURE ACT REC'D	EST ACT HRS	COMP COM	PLATE/ PAINT IN	OUT	AREA
99	A/R								WIRE, TEFLON 12 AWG		1500376												
100	2								* 6-32 HEX NUT		6786322												
101	A/R								WIRE, HIGH TEMP 12 AWG	12958/JB53LG5-1	1501414												
102	1								PLUG, POWER 240V	HUBBLE 4570-C	2000224												
103	1					A	1600012	C	NULL, TERMINAL COVER		1600012												
~~104~~	~~1~~								~~PLUG (P2)~~		~~2600409~~												
105	2								* 6-32 × 3/4 PHP-MS		6806323-404												
106	2								* 4 × 1/4 PHP-SMS		6904140-400												
107	1					B	1643476		IDENT. PLATE		1643476												
108	1					B	2618017	B	CO_2 ASSY (300 PSI) DUAL STEM	/6 /7	2618017-001												
00																							
01	~~1~~					B	~~2618005~~		~~CO_2 VALVE WELDMT ASSY~~		~~2618005-002~~												
02	1					B	1647844		INJECTOR ASSY, CO_2 DUAL STEM		1647844-001												
00																							
01	1					B	1647397		FITTING, INJECTOR	M/F 3620125	1647397-101												
02	1					B	1647842		TUBE, CO_2 INJECTOR	TYPE 304 SS 1/8 O.D. .035 W.	1647842-103												
03	1					B	1647842		TUBE, CO_2 INJECTOR	TYPE 304 SS 1/8 O.D. .035 W.	1647842-104												
04																							
03	A/R								INSULATION	PRESSTITE TYPE 5	2400026												
04	1					B	1647407		CO_2 VALVE + BRACKET ASSY	MULTI-USAGE	1647407-002												
109						B	2600409		PLUG MOD. P2														
00																							
01	1								PLUG, 4 PIN AUDIO	AMPHENOL 91 MC4M	2000051												
02	1								CHAIN 4"		1500226												

NOTES:

/6 CO_2 PSI OPTIONAL PER CUSTOMER PREFERENCE

/1 3900R (300 PSI) USE 2618017-002

P/L 2636283

P.L. 2636283 REV ____ SHT 13 OF 13

DESCRIPTION TOP ASSY 3900 CHAMBER

NEXT ASSY END ITEM BY ____ CK'D ____ APPD ____

REV	ECN	DATE	BY	APP

DELTA DESIGN
5725 KEARNY VILLA RD
SAN DIEGO, CALIF

JOB NO ____ S.O NO ____
QTY ____ PROM DATE ____ ACT ____
RUN * ____ MACH ____

ITEM NO	ASSY & QTY -001	-002	-003	-004	INDENTURE	SIZE	DRAWING NO.	REV	DESCRIPTION	MFG OR MFG NO	STOCK OR PART NO	JOB QTY	AUL	QTY REC	FAB CD	PURCHASING PO NO	QTY	DUE	REC	MANUFACTURE ACT STD HRS	EST COM	ACT COM	PLATE/PAINT IN	OUT	AREA
03	2								#6 EYELET		3600101														
04	1								#2-56 X 5/32 PHP-MS																
05	A/R								WIRE 20 GA. BUS																
06	1								#2 FLAT WASHER		6602000006														
07																									
00	REF				Δ	D	1640083		CO_2 TO LN_2 WITH REDUNDANT VALVE		1640083-001														
00	REF				Δ	D	1640083		CO_2/LN_2 DUAL WITH REDUNDANT VALVE		1640083-002														
110																									
111																									
112																									
113	1					B	1650205		COVER, CUTOUT		1650205-101														
114																									
115	2								#4-40 x 3/8 PHP-MS		6804403-804														
116	2								#4 SPLIT LOCKWASHER		6604010														
117	2								#4-40 HEX NUT		6704400-001														
118																									
119																									
120	REF					D	1650240		CHAMBER, TYPE II CONTROLLER RETROFIT Δ8		1650240-001														
00																									
01	REF					D	1650223		INTERCONNECT ASSY TYPE II CONTROLLER Δ8		1650223-001														
									MULTI-USAGE -																

NOTES: Δ8 THESE DRAWINGS & P/L TOGETHER MAKE UP THE RETROFIT KIT!

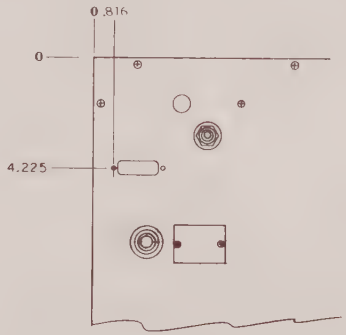
P/L 2636283

REVISIONS			
ZONE	LTR	DESCRIPTION	DATE	APPD

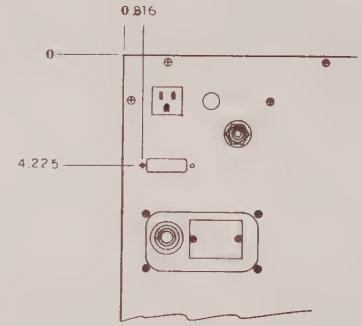
— INSTRUCTIONS FOR CHAMBER RETROFIT—
TYPE V CONTROLLER

1. REMOVE CHAMBER RIGHT SIDE PANEL TO ALLOW ACCESS TO CONTROLLER & PROBE GUIDE TUBE. ON MODELS 2850, 5900 & 7650 TOP PANEL MUST BE REMOVED AS WELL.
2. REMOVE EXISTING CONTROLLER & ITS PROBE. DO NOT DESTROY BLACK PRESS-TITE.
3. NOTE CHAMBER REAR PANEL CONFIGURATION & DECIDE WHICH MEANS OF MOUNTING THE REMOTE INTERFACE CABLE ASSY. PLUG BEST SUITS YOUR CHAMBER & REQUIREMENTS →
4. MAKE THE REAR PANEL MODIFICATIONS
5. MOUNT THE REMOTE INTERFACE CABLE ASSY PLUG TO THE REAR PANEL— SEE DRAWING D1650223 & PARTS LIST FOR CABLE & HARDWARE CALLOUTS
6. INSERT THERMOCOUPLE ASSY IN PROBE GUIDE TUBE & SECURE IN PLACE USING BLACK PRESS-TITE — SEE DRAWING D1650223
   — CAUTION — DO NOT SHORTEN THERMOCOUPLE ASSY WIRE FOR ANY REASON
7. INSTALL TYPE V CONTROLLER & WIRE PER WIRING DIAGRAM D1643470 OR D1643471 SHEET 2 OF 2. IF NECESSARY, COIL EXCESS THERMOCOUPLE WIRE & POSITION IT BETWEEN CONTROLLER & CHAMBER TO ACT AS A SERVICE LOOP IF NEEDED
8. REPLACE TOP PANEL IF YOU HAVE A MODEL 2850, 5900 OR 7650
9. BEFORE REPLACING SIDE PANEL SEE CONTROLLER MANUAL FOR SET UP & CALIBRATION PROCEDURES
10. CALIBRATE CONTROLLER
11. REPLACE SIDE PANEL

MODEL 3900 REAR PANEL CONFIGURATIONS—
MODIFY BY ADDING CUTOUT AT DIMENSIONS SHOWN

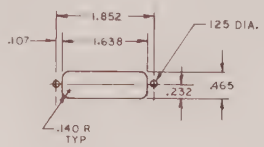


1/2 SCALE



1/2 SCALE

1. REMOTE INTERFACE CABLE ASSY PLUG CUTOUT DIMENSIONS:

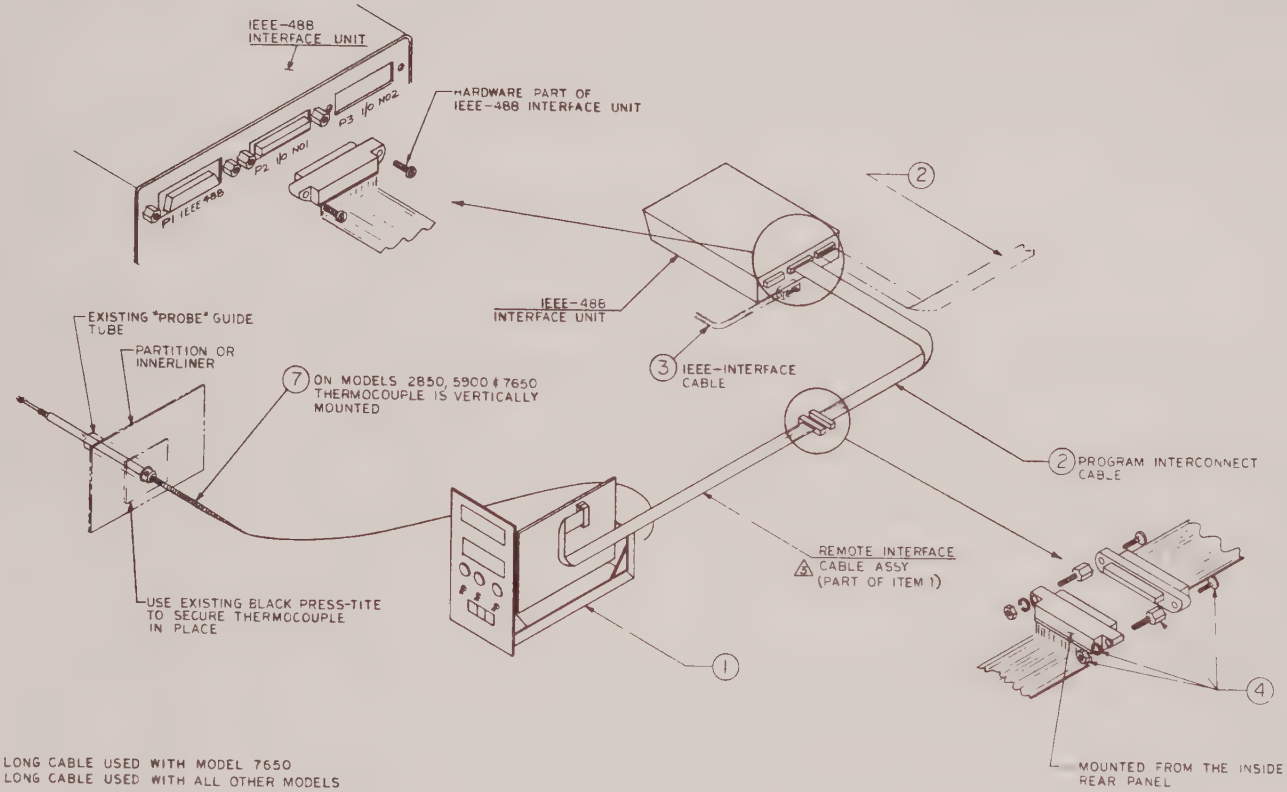


⚠ FINISH (IF APPLICABLE)

⚠ MATL (IF APPLICABLE)

NOTES: UNLESS OTHERWISE SPECIFIED

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPD



5 36" LONG CABLE USED WITH MODEL 7650
28" LONG CABLE USED WITH ALL OTHER MODELS

6 FINISH (IF APPLICABLE)

6 MATL (IF APPLICABLE)

NOTES: UNLESS OTHERWISE SPECIFIED

QTY	NEXT ASSY	USED ON
-	1635573	7145
-	1636342	6413
-	1636061	5911
-	2036681	5900
-	1635412	7650
-	1605101	2350

APPLICATION | SERIAL NO. | DATE EFF | BASED ON REV | EFFECTIVITY

ENGINEERING ACTIVITY

DESIGN	
DRAFTED	TLK JWH 11 84
CHECKED	
APPROV	
RELEASE	

MATERIAL 5 | FINISH 6 | DO NOT SCALE DWG

DELTA DESIGN INC.
A SUBSIDIARY OF [illegible]

TITLE:
INTERCONNECT ASSY.
TYPE V CONTROLLER WITH
IEEE-488

SIZE	CODE IDENT	
D		1650223

SCALE | SHEET 1 OF 1

P.L. 1650223 REV ____ SHT 1 OF 1

DESCRIPTION INTERCONNECT ASSY TYPE V CONTROLLER WITH IEEE-488

NEXT ASSY MULTI-USAGE BY E.J.O. CK'D ____ APPD ____

REV	ECN	DATE	BY	APP

DELTA DESIGN
5725 KEARNY VILLA RD
SAN DIEGO, CALIF

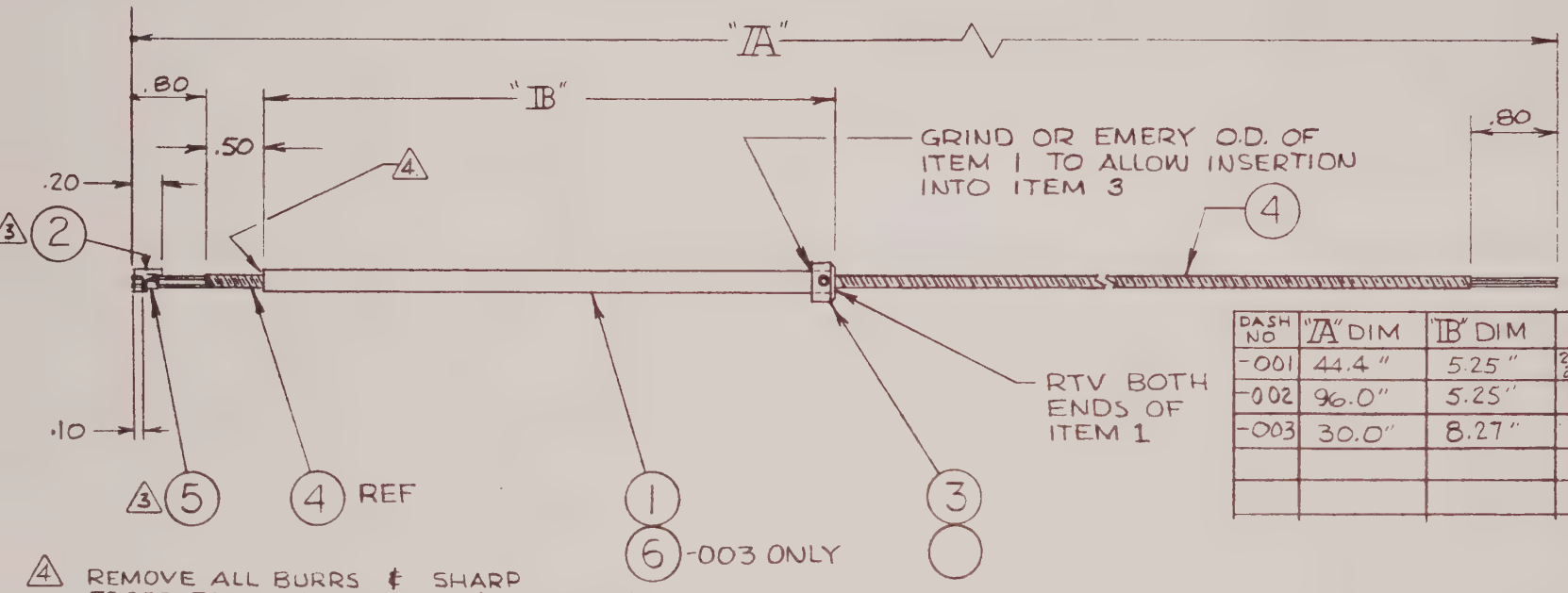
JOB NO. ____ S.O. NO. ____
QTY ____ PROM DATE ____ ACT ____
RUN * ____ MACH ____

ITEM NO	ASSY & QTY -001	-002	-003	-004	INDENTURE	SIZE	DRAWING NO.	REV	DESCRIPTION	MFG OR MFG NO.	STOCK OR PART NO.	JOB QTY	ALL	QTY REC	FAB CD	PURCHASING P.O. NO.	QTY	DUE	REC'D	MANUFACTURE ACT HRS	EST ACT COM	COM	PLATE/PAINT IN	OUT	AREA
00	X					D	1650223		INTERCONNECT ASSY- TYPE V CONTROLLER WITH IEEE-488		1650223-001														
00																									
00																									
00																									
00																									
00																									
00																									
01	REF					D	1650160		TYPE V CONTROLLER		1650160-001														
02	1								PROGRAM INTERCONNECT CABLE																
03	1								IEEE-488 INTERFACE CABLE																
04	1								JACK SOCKET ASSY.	ANSLEY #609-003	1700324														
05																									
06																									
07	1					B	1650230		THERMOCOUPLE ASSY	MULTI-USAGE	1650230-001														

NOTES:

1650223
P/L

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPD
	A	PER ECN M2052 THAMES 6-18-80 TABULATION .002 8.27 WAS 8.12	8-15-80	



DASH NO	"A" DIM	"B" DIM	USED ON
-001	44.4"	5.25"	2300 THR. 7650, 2850A
-002	96.0"	5.25"	8000
-003	30.0"	8.27"	2300A

4. REMOVE ALL BURRS & SHARP EDGES FROM I.D. OF ITEM 1 (BOTH ENDS)

3. INSURE ITEM 5 IS SOLIDLY CRIMPED OVER ITEM 4 — THEN ITEM 2 IS CRIMPED OVER ITEM 5

FINISH (IF APPLICABLE)

MATL (IF APPLICABLE)

NOTES: UNLESS OTHERWISE SPECIFIED

DASH	QTY	NEXT ASSY	USED ON
003	1	MULT-USAGE	
002	1	16-50223	Ref
001	1	1650223	

APPLICATION | SERIAL NO. | DATE EFF | DWG REV | EFFECTIVITY

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
DECIMALS: .XX ± .03; .XXX ± .010
ANGLES: 0° 30'
HOLE TOLERANCES

MATERIAL 1 | FINISH 2

ENGINEERING ACTIVITY: M1952

DESIGN	
DRAFTED	OLF JANK 12/6/73
CHECKED	
APPROV	
RELEASE	

DO NOT SCALE DWG

DELTA DESIGN INC.
A SUBSIDIARY OF CTMV INC.
SAN DIEGO, CA. 92123

TITLE: THERMOCOUPLE ASSY.

SIZE B | CODE IDENT | 1650230

SCALE | SHEET 1 OF 1

P.L. 1650230 REV ____ SHT 1 OF 1

DESCRIPTION THERMOCOUPLE ASSY.

NEXT ASSY MULTI USAGE BY F.J.O. CK'D ____ APPD ____

REV	ECN	DATE	BY	APP

DELTA DESIGN
5725 KEARNY VILLA RD
SAN DIEGO, CALIF

JOB NO. ____ S.O. NO. ____
QTY ____ PROM DATE ____ ACT ____
RUN * ____ MACH ____

ITEM NO	ASSY & QTY -001	-002	-003	-004	INDENTURE	SIZE	DRAWING NO.	REV	DESCRIPTION	MFG OR MFG NO	STOCK OR PART NO.	JOB QTY	AUL	QTY REC	FAB CD	PURCHASING P.O. NO	QTY. DUE REC'D	MANUFACTURE ACT STD HRS	EST ACT COM	COM	PLATE/PAINT IN	OUT	AREA
00	X					B	1650230		THERMOCOUPLE ASSY.		1650230-001												
00		X				B	1650230		THERMOCOUPLE ASSY		1650230-002												
00			X			B	1650230		THERMOCOUPLE ASSY		1650230-003												
00																							
00																							
00																							
00																							
01	1	1				B	1650230		TUBE, ALUMINUM		1650230-101												
									3/16 O.D. X .022 WALL X 5 1/4 LONG														
02	1	1	1			B	1650230		TUBE, ALUMINUM		1650230-102												
									3/16 O.D. X .022 WALL X .20 LONG														
03	1	1	1						COLLAR, SET SCREW	BFRG # CS5	1700292												
04	4'								WIRE, THERMOCOUPLE	IRON CONSTANTAN	1501375												
		8'							" "	" "	1501375												
			30"						" "	" "	1501375												
05	1	1	1						QUIKTIP	# 128543	1700327												
06			1				B1650230		TUBE, ALUMINUM		1650230-103												
									3/16 O.D. X .022 WALL X 8.27" LONG														

NOTES:

P/L 1650230

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